

A REVISION OF THE GENUS *LOXANDRUS* LECONTE (COLEOPTERA: CARABIDAE) IN NORTH AMERICA^{1, 2, 3}

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ABSTRACT: Fifty-two species in the genus *Loxandrus* are recognized as occurring in North America. Twenty-seven new species are described. A key to the species, descriptions, locality records, illustrations of pertinent anatomical parts and a discussion of the phylogenetic relationships and the zoogeography of the 52 species are presented. Nine additional species from Australia and three species from South America are treated in the phylogenetic and zoogeographic sections but not in the taxonomic section. Based on the information now available it is postulated that the genus may have arisen in Middle or South America and then dispersed to North America, Australia and New Guinea.

INTRODUCTION

The genus *Loxandrus*, a taxon of the order Coleoptera, family Carabidae, has historically been considered as having its closest affinities with other genera comprising the tribe Pterostichini. Ball (1962), in the most recent comprehensive study of the North American beetle family Carabidae, placed the tribe Pterostichini in the subfamily Carabinae and in division B, the Caribida. Other workers (Darlington, 1962; Blackburn, 1890, 1892, 1907; Sloane, 1898, 1903; Straneo, 1949, 1951, 1953; Tschitscherine, 1898, 1900, 1901; Moore, 1965) who studied the species of *Loxandrus* occurring in South America, Australia and New Guinea also considered the genus to belong in the tribe Pterostichini. I concur with Ball's hierarchical arrangement and placement of *Loxandrus*.

The need for a generic revision of the genus *Loxandrus* was pointed out by Ball (1962). The complexity of the evolution and phylogenetic relationships in the tribe Pterostichini and its genera was discussed by Darlington (1962), Moore (1965) and Ball (1966). The lack of information in these two areas prompted my original investigation of *Loxandrus*. The following paper is a presentation of findings, thus far, concerning the taxonomy and phylogenetic relationships among species of the genus *Loxandrus*.

LeConte's original description characterized the genus *Loxandrus* as follows:

Antennae slender, base not carinate; palpi cylindrical, slender, ultimate article not short, mentum dentate, ligula flat, apex truncate; labrum not emarginate; mandibles short; elytra with one dorsal puncture; scutellar stria not impressed; tarsi slender; outside of posterior tarsi sulcate, anterior tarsal segments one to three dilated, inside prolonged, outside oblique.

All the characters mentioned in the original description are valid and are used in present day taxonomic works to characterize *Loxandrus*. In addition to those characters mentioned by LeConte an additional character is necessary to distinguish the genus *Loxandrus* from the genus *Oxycrepis* Reiche. Members of the genus *Oxycrepis* have the sides of the pronotum strongly constricted towards the base. This constriction is not evident in any species of *Loxandrus*. The genus *Loxandrus*, as it is interpreted in this paper, cannot be set apart on any one single character but can be defined by utilizing the combination of characters recorded by LeConte plus the additional character of the base of the pronotum not being constricted.

HISTORICAL SUMMARY

LeConte (1852), in his synoptic work on *Pterostichus* Bonelli and allied genera, "synthesized" and described *Loxandrus*. He included in *Loxandrus* three new species and eight species previously described by himself and other authors in other genera. The eight previously named species were described by LeConte (1848), Say (1823), Dejean (1828), and Chaudoir (1843) and were assigned to one of the following genera: *Argutor* Stephens, *Feronia* Latrielle, *Megalostylus* Chaudoir or *Pogonus* Nichol. Since 1852 several workers published on new species of *Loxandrus* from North America. Motschulsky (1865) described a new species from Mississippi and one listed from North America. Chaudoir (1868) described three new species, one each from Texas, Louisiana and South Carolina. LeConte (1878) also described three new species from Florida. Blatchley (1918) described two new species from Florida. Casey (1918) revised the genus *Loxandrus* but did not include all the species that had been described from North America. He also described nineteen new species at that time as well as two additional new species in 1924. Since 1924, only one worker, Wright (1939), has described a new species of *Loxandrus* from the United States and the group as a whole has not been treated since Casey's work in 1918. Darlington (1938) recorded *L. infimus* Bates, previously known only from Mexico and Central America, from Brownsville, Texas.

Darlington (1934, 1935) treated the genus as it occurs in the West Indies. He described two new species, one from Cuba and one from Haiti and recorded the occurrence of several other previously-described species but did not provide a key to these forms.

Bates (1871, 1881, 1891) described five species occurring in the Mexico-Central America area. He did not give a key to the species and only listed the general location from which the type material came.

Lindroth (1966) recorded two species from Southern Ontario, Canada. A key was presented and a type locality for a third species not occurring in Canada, *L. erraticus* (Dejean), was designated.

BIOLOGY AND DISTRIBUTION

Very little is known concerning the biology of *Loxandrus* species. Adults are found near water, under stones and logs along stream banks, and on flood plain areas. They can be obtained by treading vegetation in swamps and along stream banks. Some species have also been collected at black light traps. Life history studies have not been made for any of the species and no larval forms have been associated with the genus. Species of the genus occur as far north as Southern Canada in the Eastern United States and west to Illinois, Missouri, Arkansas and South-western Texas. They are also found in Mexico, Central America, the Antilles, Australia and in New Guinea. One species has been recorded from Celebes.

METHODS AND MATERIALS

The material for this study consisted of over 3,000 borrowed specimens of *Loxandrus* representing 61 species. Several hundred specimens belonging to related groups were also examined. These consisted of 58 species representing 29 genera and subgenera in three tribes belonging to the family Carabidae. These related species, genera, subgenera and tribes were studied in order to establish the ancestral and derived states of characters in the genus *Loxandrus*. These specimens were preserved on insect pins or points. The external morphology and genitalia of all these species were examined. The external anatomical parts are illustrated in Figure 1A, B.

The genitalia of the males of all species, when available, were examined. The genitalia of the females were also examined but few stable taxonomic characters were found.

The following method was used to remove the genitalia and prepare them for study. Specimens were placed in household ammonia for about 20 minutes. They were then removed and placed in boiling water for 2-3 minutes. As each specimen was removed from the boiling water, it was placed on a paper towel, which absorbed the excess water, and then dissected under a stereo-microscope. Using a pair of small scissors, an incision was made on the dorsal surface of the abdomen from the midpoint of the apex along the lateral margin for a short distance. The genitalia were removed by reaching under the "flap" with a pair of forceps and removing them. Internal membranes and muscles still attached to the genitalia were cut with the scissors.

The basal ring of the males was left in the abdomen and not removed. The genitalia were then placed in individual small tubes containing 10–20 percent potassium hydroxide in a water bath and heated to just below boiling for 10–15 minutes. The genitalia were removed and placed under the microscope in 70 percent alcohol and agitated to force the potassium hydroxide and dissolved tissues from the median lobe of the males and from around the coxites of the females. The female genitalia were then placed in glycerine.

After being subjected to hot potassium hydroxide, the walls of the median lobe of the aedeagus become somewhat transparent, and the scale groups on the internal sac were visible. In most instances, it was desirable to evert the sac to gain a better idea of the arrangement of the scale groups. This was accomplished by either of two methods. The first method employed the use of a minute insect pin that had been bent to form a hook at its tip. The base of the pin was inserted in a match stem that served as a handle. The hooked pin was inserted into the apex of the median lobe and the internal sac gradually pulled out. The second method, the one used most often by this writer, utilized a hypodermic syringe, a small hypodermic needle and 70 percent alcohol. The syringe was filled with 70 percent alcohol and the needle tip was placed in or against the basal foramen of the median lobe. The median lobe was held firmly but not tightly between a pair of forceps. The alcohol was injected into the basal foramen and the pressure thus created forced the internal sac out. Using this technique, the internal sac of about 98 percent of all specimens examined were everted. After washing in alcohol, whether the internal sacs were everted or not, the genitalia were placed in glycerine for 30 minutes before transferring them to genitalia vials containing glycerine. The vials were then placed on the insect pins under the specimens.

MEASUREMENTS. Measurements were made of the length and width of the head, thorax, and elytra. Abbreviations used for the measurements are as follows: TL—total length; WE—width across eyes, outside margins; WP—width of pronotum at widest point; WW—width across elytra at widest point. The total length was derived by combining the lengths of the head, thorax, and abdomen which were measured individually as follows: head—from the anterior margin of the clypeus along the midline to an imaginary line connecting the posterior margins of the compound eyes; thorax—from the anterior to the posterior margin along the midline; elytra—from the apex of the scutellum to the apex of the right elytron along the midline. All measurements are in millimeters.

ABBREVIATIONS.

An asterisk (*) has been used in the locality sections of the descriptions to note localities that could not be located and mapped.

Museums and Private Collectors

AM	— American Museum of Natural History, New York
BM	— British Museum (Natural History), London
CAS	— California Academy of Sciences, San Francisco
CINM	— Cincinnati Museum of Natural History, Cincinnati
CNC	— Canadian National Collection, Ottawa
CNHM	— Chicago Natural History Museum, Chicago
CU	— Cornell University, Ithaca
FSPB	— Florida State Collection of Arthropods, Gainesville
GB	— George Ball Collection, Edmonton
GN	— Gerald Noonan Collection, Washington, D. C.
INHS	— Illinois Natural History Survey, Urbana
MCZ	— Museum of Comparative Zoology, Cambridge
MNHP	— Museum of Natural History, Paris
MSU	— Michigan State University, East Lansing
NCSC	— North Carolina State University, Raleigh
OSU	— Ohio State University, Columbus
PSU	— Pennsylvania State University, University Park
PU	— Purdue University, Lafayette
RTB	— Ross T. Bell Collection, Burlington
TAM	— Texas A & M University, College Station
TLE	— Terry L. Erwin Collection, Cambridge
UA	— University of Arkansas, Fayetteville
UK	— University of Kansas, Lawrence
UM	— University of Michigan, Ann Arbor
UMIN	— University of Minnesota, St. Paul
UMO	— University of Missouri, Columbia
USNM	— United States National Museum, Washington

Anatomical Regions

AN	— Antenna	I1—I9	— Intervals
AS	— Ambulatory setae	IS	— Internal sac
ATS	— Anterior sulcus	LM	— Lobes of mentum
BI	— Basal impression	LP	— Labial palpi
C	— Clypeus	LPA	— Left paramere
CE	— Compound eye	MC	— Mesocoxae
CX	— Coxae	FS	— Frontal sulci
F	— Femur	ML	— Median lobe
FR	— Frons	MN	— Mentum
G	— Gula	MS	— Mesosternum
GE	— Gena	MT	— Metasternum
H	— Humerus	MTM	— Metepimeron

MTP — Metepisternum	S — Sclerite
MXP — Maxillary palpi	SA — Scale area
PA — Posterior angle	SC — Scutellum
PC — Procoxae	SG — Scale group
PE — Epipleura of pronotum	SR — Sclerotized ring
PM — Proepimeron	STI — Sternites of abdomen
PP — Proepisternum	T — Tibia
PR — Intercostal process	TC — Tarsal claw
MES — Mesepimeron	TO — Tooth of mentum
PS — Prosternum	TR — Trochanter
RPA — Right paramere	TS — Tarsal segments

TYPES

Besides trying to follow the Rules of Zoological Nomenclature, two additional objectives influenced my work with types. First, in most instances species of *Loxandrus* cannot be accurately identified unless the internal sac of the male aedeagus is examined. Thus most species that are based on female types cannot be, at this time, adequately diagnosed. Secondly, I do not wish to multiply the number of names available for *Loxandrus* if it can be avoided. Therefore in this paper species are utilized that are based on female types but have a male that was in the original type material. I have tried to determine from the original description and from any other sources (mainly personal communication with other specialists) precisely what material was in the original series.

The types of three species, *Loxandrus parvulus* Chaudoir, *L. inquietus* Casey, and *L. duryi* Wright, could not be located. However, a male paratype of *L. duryi* was studied and this species is considered in more detail below. The types of the two species described by Motschulsky, *L. commutables* and *L. iris*, were not available for study. The types of the latter two species are presumably in the Moscow Museum in Moscow, USSR.

The following tables contain information accumulated concerning *Loxandrus* types for North America.

TABLE I.

Species in the genus *Loxandrus* based on male types or with a male in the original material. Type localities given in text.

<i>L. agilis</i>	Dejean	1828:244	♂ (MNHP)
<i>L. brevicollis</i>	LeConte	1848:338	♀ 3 specimens in the series; the third specimen in the series is a ♂ (MCZ)

TABLE I (Continued)

<i>L. brunneus</i>	Blatchley	1918:417	♂ (PU)
<i>L. calathinus</i>	LeConte	1878:376	♀ Type no. 5693, one additional specimen in the series, a ♂ (MCZ)
<i>L. celeris</i>	Dejean	1828:246	♂ (MNHP)
<i>L. cervicalis</i>	Casey	1918:391	♂ (USNM)
<i>L. cincinnatiensis</i>	Casey	1924:80	♂ (USNM)
<i>L. crenatus</i>	LeConte	1852:252	♂ (MCZ)
<i>L. crenulatus</i>	Chaudoir	1868:343	♂ (MNHP)
<i>L. cubanus</i>	Tschitscherine	1903:60	♂ (MNHP)
<i>L. duryi</i>	Wright	1939:257	♂ (Unlocated)
		paratype	♂ (CINM)
<i>L. erraticus</i>	Dejean	1828:24	♂ (MNHP)
<i>L. flavilimbus</i>	Blatchley	1918:418	♂ (PU)
<i>L. floridanus</i>	LeConte	1878:376	♀ 7 specimens in the series, second specimen is a ♂, two additional ♂♂ in the series, all the same species (MCZ)
<i>L. infimus</i>	Bates	1882:87	♂ <i>lectotype</i> here designated (BM)
<i>L. laticollis</i>	Chaudoir	1868:342	♂ (MNHP)
<i>L. lucens</i>	Chaudoir	1868:342	♂ (MNHP)
<i>L. lucidulus</i>	Dejean	1831:239	♂ (MNHP)
<i>L. mandibularis</i>	Casey	1918:382	♂ (USNM)
<i>L. micans</i>	Chaudoir	1868:342	♂ (MNHP)
<i>L. minor</i>	Chaudoir	1843:766	♂ (MNHP)
<i>L. mutans</i>	Darlington	1935:180	♂ Type No. 22022 (MCZ)
<i>L. nitidulus</i>	LeConte	1848:239	♀ 4 specimens in the series, the second specimen is a ♂ (MCZ)
<i>L. nocticolor</i>	Darlington	1934:91	♂ (MCZ)
<i>L. parallelus</i>	Casey	1918:396	♂ (USNM)
<i>L. rapidus</i>	Chaudoir	1868:344	♂ (MNHP)
<i>L. rectangulus</i>	LeConte	1878:377	♂ (MCZ)
<i>L. rectus</i>	Say	1825:58	♂ neotype designated by Lindroth & Freytag (1969) (MCZ)
<i>L. reflexus</i>	LeConte	1878:376	♀ Type No. 5692, three additional specimens in the series, second specimen is a ♂ (MCZ)
<i>L. saphyrinus</i>	Chaudoir	1843:766	♂ (MNHP)
<i>L. scitus</i>	Casey	1918:388	♂ (USNM)
<i>L. sculptilis</i>	Bates	1884:(278)	♂ <i>lectotype</i> here designated (BM)
<i>L. taeniatus</i>	LeConte	1852:(252)	♂ (MCZ)
<i>L. tetrastigma</i>	Bates	1882:87	♂ (MNHP)
<i>L. unistigma</i>	Bates	1882:87	♂ <i>lectotype</i> here designated (BM)
<i>L. velocipes</i>	Casey	1918:390	♂ (USNM)
<i>L. velox</i>	Dejean	1828:245	♂ (MNHP)

TABLE II.

Species in the genus *Loxandrus* based on female types without a male in the original material. Type localities given.

<i>L. accelerans</i>	Casey	1918:386	♀	Type No. 47338 Texas, Galveston. (USNM)
<i>L. breviusculus</i>	Casey	1924:80	♀	Type No. 47350 Florida, Dune-din. (USNM)
<i>L. collucens</i>	Casey	1918:382	♀	Type No. 47336 Texas, Houston (USNM)
<i>L. comptus</i>	Casey	1918:387	♀	Type No. 47349 Florida, Dune-din (USNM)
<i>L. contumax</i>	Casey	1918:388	♀	Type No. 47352 Florida, Indian River (USNM)
<i>L. cursitans</i>	Casey	1918:387	♀	Type No. 47348 Florida, Dune-din (USNM)
<i>L. concinnus</i>	Casey	1918:341	♀	Type No. 47353 Florida, Dune-din (USNM)
<i>L. fulgens</i>	Casey	1918:388	♀	Type No. 47344 Mississippi, Vicksburg (USNM)
<i>L. lateralis</i>	Casey	1918:381	♀	Type No. 47347 Florida, Sara-sota (USNM)
<i>L. limatus</i>	Casey	1918:382	♀	Type No. 47335 District of Co-lumbia. (USNM)
<i>L. ludovicianus</i>	Casey	1918:383	♀	Type No. 47337 Louisiana, Cane River. (USNM)
<i>L. mundus</i>	Casey	1918:385	♀	Type No. 47341 Florida, La-Belle. (USNM)
<i>L. parvicollis</i>	Casey	1918:389	♀	Type No. 47343 Texas, Galves-ton. (USNM)
<i>L. piceolus</i>	Chaudoir	1868:343	♀	A single specimen from Texas, C. Pilate (Coll.?). (MNHP)
<i>L. piciventris</i>	LeConte	1848:237	♀	Type No. 5698 Georgia (MCZ)
<i>L. proximus</i>	Chaudoir	1868:344	♀	Chaudoir states in the original description that he was studying a ♂. The specimen I found in the MNHP was a ♀. The genitalia had been destroyed or lost. The Chaudoir determination label gives Texas as the locality. This locality agrees with the original description.
<i>L. pusillus</i>	LeConte	1852:252	♀	Type No. 5699 Georgia. (MCZ)
<i>L. rubricatus</i>	Bates	1891:250	♀	(BM)
<i>L. suturalis</i>	Casey	1918:384	♀	Type No. 47339 Florida, Dune-din (USNM)
<i>L. vulneratus</i>	Casey	1918:390	♀	Type No. 47354 Indiana. (USNM)

TABLE III.

Species in the genus *Loxandrus* for which a type could not be located or was unavailable for study.

<i>L. blatchelyi</i>	Csiki	1930	A name proposed for <i>L. brunneus</i> Blatchley now a synonym of <i>L. cervicalis</i> Casey	
<i>L. commutabilis</i>	Motschulsky	1865:243		
<i>L. inquietus</i>	Casey	1918:389	♀	Indiana.
<i>L. iris</i>	Motschulsky	1865:242		
<i>L. parvulus</i>	Chaudoir	1868:342	♀	Carolina

MORPHOLOGY

The general external morphological characters are illustrated in Figures 1 A, B. The characters used in this paper are familiar to most systematists. Thus, most of them are self-explanatory and only a few warrant discussion in this section.

In most species of *Loxandrus*, the lobes of the mentum are evidently longer than the mental tooth (Figs. 141, 142, 143). However,

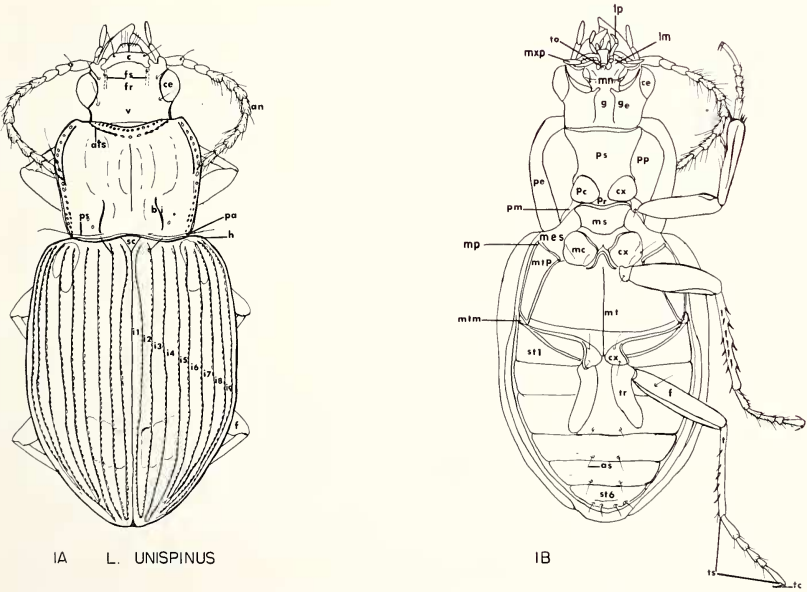


FIG. 1. Habitus, *L. unispinus* n. sp. 1 A. Dorsal. 1 B. Ventral.

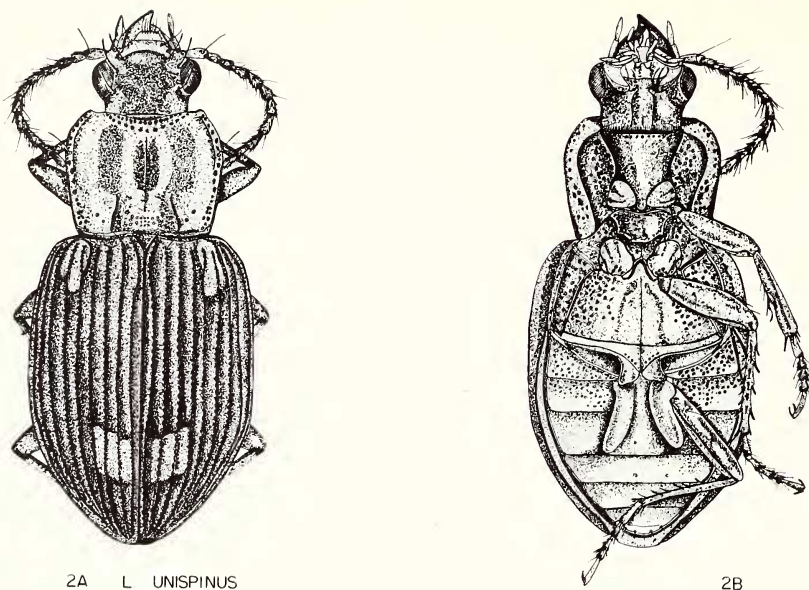


FIG. 2. Habitus, *L. unispinus* n. sp. 2 A. Dorsal. 2 B. Ventral.

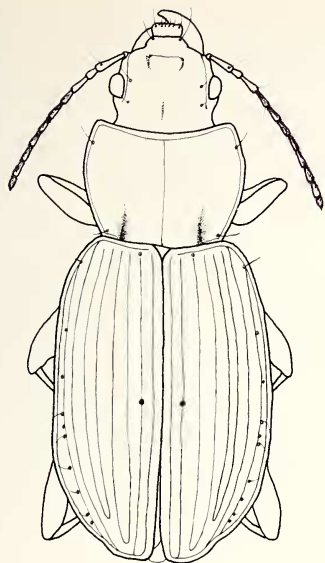
in a few species, the length of the tooth is equal to the length of the mental lobes (Figs. 138–140). This gives the mentum a more transverse appearance.

The external surface of all sclerites has a characteristic type of microsculpture, or the microsculpture is entirely absent. Two basic types of microsculpture with several intermediate types are present. The two basic types are referred to as isodiametric (Figs. 11 A, B; 16 A, B, C; 20 A, B, C) and transverse (Figs. 12, 15). The transverse type can be extremely stretched into fine parallel lines (Fig. 15) or only slightly stretched.

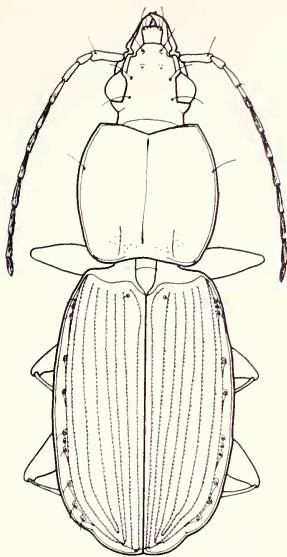
The shape of the pronotum is characteristic for many species groups as well as individual species. The lateral margins are either evenly rounded from the posterior to the anterior margins (Fig. 35 B) or slightly oblique (Fig. 47) or sinuate (Fig. 45) in the posterior $\frac{1}{4}$ to $\frac{1}{3}$. Since these variations are sometimes difficult to convey in words, they have been illustrated (Figs. 25 to 70).

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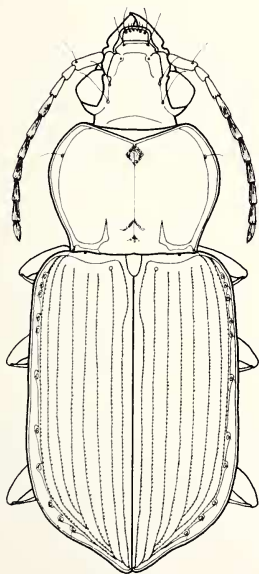
FIGS. 3–6. Habitus, dorsal. 3. *L. infimus* Bates. 4. *L. parallelus* Casey. 5. *L. remotus* n. sp. 6. *L. gibbus* n. sp.



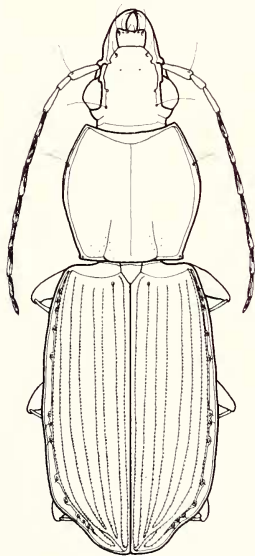
3 L. INFIMUS



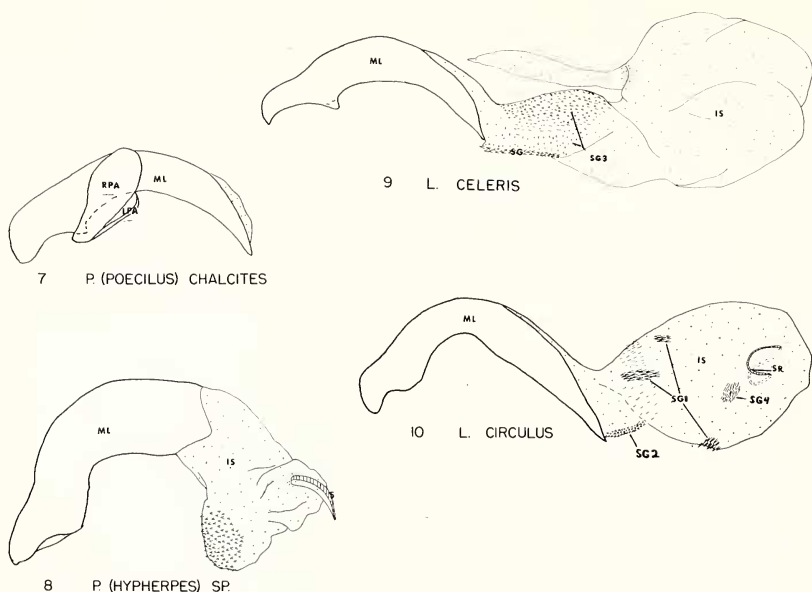
4 L. PARALLELUS



5 L. REMOTUS



6 L. GIBBUS



FIGS. 7-10. Male genitalia, left lateral aspect. 7. *Pterostichus* (*Poeecilus*) *chalcites* Say. 8. *Pterostichus* (*Hypherpes*) sp. 9. *L. celeris* (Dej.). 10. *L. circulus* n. sp.

Characters associated with the genitalia, especially the males, are complex and difficult to describe. In many species of *Loxandrus*, only the males can be recognized, based on characters associated with the male genitalia. For these reasons, numerous illustrations of the male genitalia are provided.

The male genitalia of *Loxandrus* are composed of a median lobe with an internal sac and a pair of parameres at the base of the median lobe (Fig. 7). The internal sac can be everted as previously described. Associated with the genitalia is a sclerotized ring process: the modified 9th abdominal sternite which appears to possess no taxonomic or phylogenetic characters.

The scale groups on the internal sac are constant in position and characteristic for each species of *Loxandrus*. The number of scales in each group varies from specimen to specimen but the variation is not significant in species recognition. With the stereo-microscope, several different types of scales can be identified. The most common type is moderately long with a pointed apex (Fig. 10 SG1). The size range of this type of scale is variable (Fig. SG2). They are usually found in groups but occasionally a small group may be reduced to one scale

(Fig. 109 D). A second common scale type is a very small weakly-sclerotized scale with the apex usually rounded but sometimes minutely pointed (Fig. 9 SG3). These do not usually form well-defined groups. They are more common in the basal portion of the sac but are not uncommon over much of the surface of the sac. A third type of scale that is relatively rare is hair-like (Fig. 10 SG4). They are very slender and pointed and are usually found in small groups (Figs. 102 A; 103 B). In one species, *L. rectangulus* LeConte, they occur over much of the surface of the sac (Fig. 74 A, B). In *L. spinigrandis* (Fig. 83 A, B) large, strong spines are present on the internal sac. These different types and their significance have not been studied in detail. The function of the scales is also unknown. They may or may not be a part of a lock and key mechanism essential for fertilization of the female.

Sclerotized bars, plates or sclerites are found on the internal sac of only one species of *Loxandrus*, *L. dubius* Curt. Sclerites are common on the internal sacs of other Pterostichine species however (Fig. 8 S).

In many species of *Loxandrus* a sclerotized ring occurs on the internal sac towards the apex. In other species the ring is weakly sclerotized and in a third group it is totally absent. This may be the exit of the ejaculatory duct, the gonopore. In those species in which a well-developed ring is present the ejaculatory duct was traced to the opening. However, an opening was not found for the ejaculatory duct in those species without the ring. I have, therefore, referred to this only as a "sclerotized ring" in this paper.

THE GENUS *LOXANDRUS*

TYPE SPECIES & LOCALITY

Feronia recta Say 1823:58. "A ♂ with genitalia dissected from South Carolina, designated by R. T. Allen as neotype and the state as type area" (Lindroth & Freytag 1969).

DESCRIPTION. General characteristics that prevail among all species of *Loxandrus* found in North America.

Head. Labrum: Anterior margin straight or slightly concave, both conditions apparent among specimens of the same species; 6 setae along the anterior margin, decreasing in length inwardly; anterior lateral angles rounded; microsculpture usually distinct, isodiametric; color always of a lighter hue than rest of head. Clypeus: anterior lateral margins rounded; 1 seta each side, removed from the anterior and lateral margins (distance variable). Mentum: tooth always well developed, apex rounded or straight; a pair of setae at base of tooth.

Submentum: a slightly elevated, well-rounded ridge; microsculpture elongate. Gular sutures: distinct; microsculpture elongate or absent. Postgenae: microsculpture elongate or absent. Eyes: large and distinct. Antennal segments: I, one dorsal seta near the apex, otherwise glabrous; II–III, a ring of setae at apex, otherwise glabrous; IV–XI, somewhat compressed laterally, pubescence covering each segment except a narrow, elongate area on each lateral surface. Mandibles: scrobes always distinct, without setae, microsculpture isodiametric. Anterior tentorial pits: distinct, located in the frontal sulci, approximate to the epistomal suture.

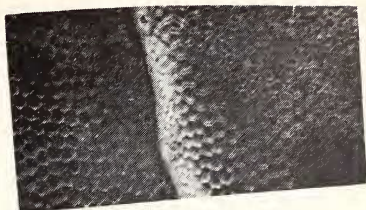
Thorax. Pronotum: 1 seta in or approximate to each hind angle; 1 seta along each lateral margin (position variable); anterior lateral angles rounded; lateral margin narrowly reflexed its entire length. Prosternum: intercoxal process not margined. Mesosternum: declivate medially; never punctate. Metasternum: area between mesocoxae margined; median sulcus reaching from posterior margin of metasternum to posterior margin of mesocoxae; lateral sulci elongate but never reaching lateral margins. Metepisternum: lateral margin always much longer than anterior margin. N. B. Microsculpture and punctation are variable on all ventral thoracic sclerites except where specifically noted above. *Legs.* Segment 5 of all tarsi usually with 2 ventral rows of very minute setae toward the apex; protarsal segments 1–3 of male obliquely dilated with 2 rows of large scales on the ventral surface. *Elytra.* 1 seta at base of stria 2; 1 seta on interval 3 approximate to stria 2 (longitudinal position variable); usually 15 setiferous punctures in stria 8 along the lateral margin; 2 setae near apex of stria 7; scutellar stria absent; lateral margin near apex usually with distinct internal plica (absent in some Central American species); lateral margin near apex distinctly sinuate. *Abdominal sternites.* Segments 3, 4 and 5 always with a pair of ambulatory setae; segment 2 with or without ambulatory setae; segment 6, males with 1 pair of setae along apical margin, females with 2 pair of setae along apical margin. *Aedeagus.* Median lobe: usually an elongate tube (modified in 4 species). Parameres: left paramere short, conchoid shaped; right paramere slightly longer than left. Internal sac: everts apically; surface covered with scales which may or may not form distinct groups; a sclerotized ring near the apex may or may not be present.

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FIGS. 11–15. Elytra, dorsal aspect. 11 A. *L. yeariani* n. sp. 11 B. Same, close-up. 12. *L. nitidulus* (LeC.). 13. *L. agilis* (Dej.). 14. *L. brevicollis* (LeC.). 15. *L. discolor* n. sp.



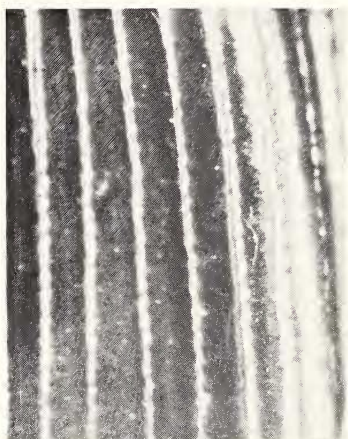
IIA L. YEARIANI



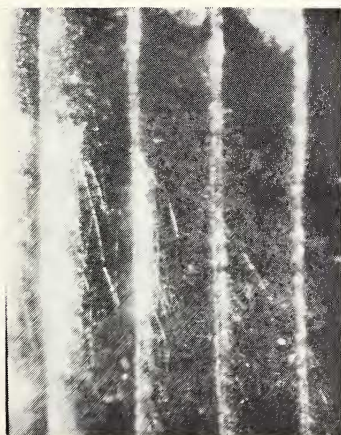
IIB



12 L. NITIDULUS



13 L. AGILIS



14 L. BREVICOLLIS



15 L. DISCOLOR

KEY TO THE SPECIES OF *LOXANDRUS* FOUND IN NORTH AMERICA

1. Microstructure on elytra distinct, isodiametric (Figs. 11 A, B) — 2
Microsculpture on elytra present or absent; if present, composed of
fine elongate, parallel lines (Figs. 12; 13; 14; 15) — 4
2. (1). Mentum with distinct fovae (Fig. 139) — 3
Mentum without fovae (Fig. 143) — 1. *L. infimus* Bates
3. (2). Large specimens, total length 7.8–8.6 —
— 2. *L. pactinullus* New Species
Smaller specimens, total length 5.8–7.3 mm. — 3. *L. sculptilis* Bates
4. (1). Microsculpture on head and pronotum distinct, mostly isodiametric
(Figs. 16 A, B, C); microsculpture on elytra distinct or not; if so,
composed of elongate stretched lines on the intervals; hind angles
of pronotum acute (Figs. 31, 32); lateral areas of pronotum
explanate — 5
Microsculpture on head present or absent; microsculpture on pro-
notum present or absent, if present never as distinct as on head
(Figs. 18 A, B); microsculpture on elytra, if present, obscure
and elongate; if hind angles of pronotum acute, then lateral areas
not explanate — 7
5. (4). Males — 6
Females keyed to this couplet belong to one of the following
species — *L. rectangulus* & *L. elongatus*
6. (5). Mid portion of IS* covered with elongate, slender, hair-like scales
(Figs. 74 A, B) — 4. *L. rectangulus* New Species
IS without elongate, slender, hair-like scales (Fig. 72) —
— 5. *L. elongatus* New Species
7. (4). Metepisternum punctate (Fig. 19 A) — 53
Metepisternum impunctate (Fig. 20 A) — 8
8. (7). Elytra bicolored (at least one central, pale-colored spot near the
apex of the elytra, or two spots basally and two spots apically on
the elytra) — 9
Elytra unicolorous — 22
9. (8). Only one centrally located pale area towards the apex of the
elytra — 10
Pale areas on each elytron located at the humeri and toward the
apex; area may be oval or elongate — 14
10. (9). Males — 11
Females — 12

* IS = Internal sac of male aedeagus.

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FIGS. 16–18. 16. Microsculpture distinct, isodiametric, *L. rectangulus* LeC. 16 A. Prothorax, dorsal aspect. 16 B. Head, dorsal aspect. 16 C. Head and prothorax, dorsal aspect. 17. Microsculpture slightly stretched, weakly present, *L. floridanus* LeC. 18. Microsculpture absent, *L. brevicollis* (LeC.). 18 A. Head, dorsal aspect. 18 B. Prothorax, dorsal aspect.



16A L. RECTANGULUS



16B



16C



17 L. FLORIDANUS



18A L. BREVICOLLIS

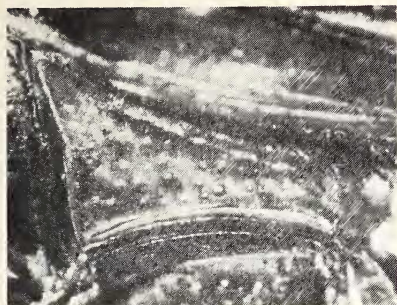


18B

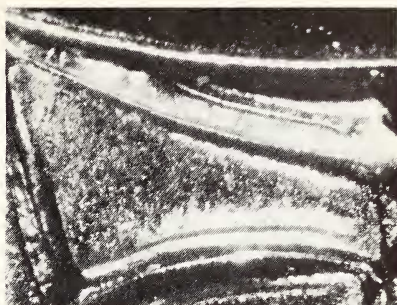
11. (10). Internal sac of the aedeagus with an elongate group of scales on the ventral surface at the base of the sac (Figs. 9; 75); usually larger in size, total length 6.1–7.2 mm. (in part) 6. *L. celeris* (Dejean)
Internal sac without any distinct scale groups (Fig. 76); usually smaller in size, total length 5.8–6.4 mm. (in part) 7. *L. cubanus* Tschitscherine
12. (10). Females from the United States (in part) *L. celeris* (Dejean)
Females from Mexico, Central America or the West Indies 13
13. (12). Females from Costa Rica, or Mexican states of Jalisco, Oaxaca, Nayarit, Sinaloa (in part) *L. cubanus* Tschitscherine
Females from Cuba or Mexican states of Campeche, Chiapas, Colima, Veracruz, San Luis Potosi (in part) *L. celeris* (Dejean)
14. (9). Males 15
Females 21
15. (14). IS without a secondary sac 16
IS with a secondary sac on the dorsal surface in the basal portion (Figs. 90 A, B) 9. *L. elnae* New Species
16. (15). IS with scales but without a distinct scale group 17
IS with at least one distinct scale group 19
17. (16). IS very elongate, almost cylindrical 18
IS shorter, sac-like, not cylindrical in shape (Fig. 85) 12. *L. lepidus* New Species
18. (17). IS with a small bulbous projection at the base on the right dorso-lateral surface (Figs. 86 A, B); smaller (in part) 10. *L. whiteheadi* New Species
IS without a bulbous projection at the base on the right dorso-lateral surface (Fig. 84); larger 11. *L. tropicus* New Species
19. (16). IS with only 1 distinct scale group 20
IS with 2 distinct scale groups (Fig. 89) 13. *L. fraus* New Species
20. (19). Scale group on the right lateral side of the sac, elongate, length $\frac{1}{2}$ or more than $\frac{1}{2}$ the entire length of the sac (Fig. 88) 8. *L. balli* New Species
Scale group on the right lateral side of the sac, short, oblong, length $\frac{1}{4}$ or less than $\frac{1}{4}$ the entire length of the sac (Figs. 87 A, B, C) 14. *L. unispinus* New Species
21. (14). Area between basal foveae of pronotum and midline usually impunctate or with only 1 puncture on each side, rarely with 2–3 punctures *L. balli* New Species

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FIGS. 19–20. 19. Thorax, ventral aspect, *L. saphyrinus* (Chaud.). 19 A. Metepisternum, microsculpture absent, punctate. 19 B. Mesepisternum, microsculpture absent, punctate. 19 C. Metasternum, microsculpture absent, punctate laterally. 20. Thorax, ventral aspect, *L. agilis* (Dej.). 20 A. Metepisternum, microsculpture isodiametric, impunctate. 20 B. Mesepisternum, microsculpture isodiametric, impunctate. 20 C. Metepisternum, microsculpture isodiametric, impunctate.



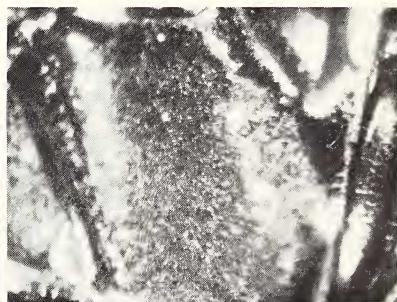
19A L. SAPHYRINUS



20A L. AGILIS



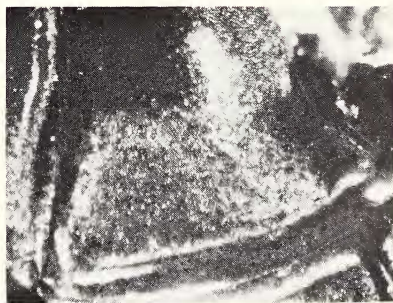
19B



20B



19C



20C

- Area between basal foveae of pronotum and midline usually with at least 4 punctures Females keyed to this couplet belong to one of the following species: *L. unispinus*, *L. elnae*, *L. fraus*, *L. lepidus*, *L. tropicus*, *L. whiteheadi* (in part).
22. (8). Mesepisternum punctured anteriorly (Fig. 19 B); abdominal segment 2 without ambulatory setae; posterior angles of pronotum broadly rounded and distinctly explanate (Figs. 43 A, B; 44 A, B); large species 23
- Mesepisternum not punctured anteriorly (Fig. 20 B); abdominal segment 2 with or without ambulatory setae, posterior angles of pronotum broadly rounded or not, not distinctly explanate; usually smaller species 25
23. (22). Specimens from United States 24
- Specimens from Mexico (in part) 15. *L. yeariani* New Species
24. (23). Larger, total length not less than 10.2 mm.; ♂ & ♀ genitalia characteristic (in part) 16. *L. rectus* (Say)
- Smaller, total length not greater than 9.3 mm.; ♂ & ♀ genitalia characteristic (in part) 17. *L. pravitubus* New Species
25. (22). Metasternum punctured toward lateral margin (Fig. 19 C) 26
- Metasternum not punctured toward lateral margin (Fig. 20 C) 30
26. (25). Males 27
- Females keyed to this couplet belong to one of the following species: *L. unilobus*, *L. saccisecundaris*, *L. taeniatus*, *L. extendus*.
27. (26). 1 or 2 scale groups present on the left lateral surface at the base of the IS approximate to the median lobe (Figs. 121 A; 131 B); IS without a small secondary sac near the apex on the right lateral surface 28
- Scale groups absent on the left lateral surface at the base of the IS (Fig. 123 A); a small secondary sac near the apex on the right lateral surface (Fig. 123 B) 18. *L. unilobus* New Species
28. (27). No secondary sacs protruding from the main IS on the left lateral surface 29
- A distinct secondary sac protruding from the left side of the main IS (Fig. 121 A) 19. *L. saccisecundarius* New Species
29. (28). Apex of IS elongate and not or only sparsely covered with weak small scales (Figs. 131 A, B) 20. *L. extendus* New Species
- Apex of IS truncate, rounded, almost entirely covered with small weakly sclerotized scales (Figs. 127 A, B) 21. *L. taeniatus* LeConte
30. (25). Pronotum with hind angles obtusely pointed, not rounded and usually weakly turned to the outside (Figs. 30 A, B; 68 A, B) 31

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FIGS. 21-24. Hind coxae, inner surface. 21. *L. agilis* (Dej.), microsculpture isodiametric. 22. *L. saphyrinus* (Chaud.), microsculpture absent. Figs. 23-34. Prothorax, dorsal aspect. 23 A. *L. fraus* n. sp. 23 B. Same, close-up of hind angle. 24 A. *L. unispinus* n. sp. 24 B. Same, close-up of hind angle.



21 L. AGILIS



22 L. SAPHYRINUS



23A L. FRAUS



23B



24A L. UNISPINUS



24B

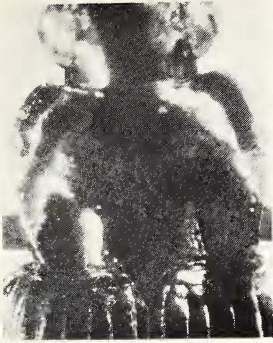
- Pronotum with hind angles rounded or if obtusely pointed then never turned to the outside 35
31. (30). Males 32
Females 33
32. (31). IS of the aedeagus with an elongate group of scales on the ventral surface at the base of the sac (Figs. 9; 75); usually larger in size, total length 6.1–7.2 mm. (in part) *L. celeris* Dejean
IS of the aedeagus without any distinct scale groups (Fig. 76) usually smaller in size, total length 5.8–6.4 mm. (in part) *L. cubanus* Tschitcherine
33. (31). Females from the United States (in part) *L. celeris* Dejean
Females from Mexico, Central America or the West Indies 34
34. (33). Females from Costa Rica or Mexican States of Jalisco, Oaxaca, Nayarit, Sinaloa (in part) *L. cubanus* Tschitscherine
Females from Cuba or Mexican states of Campeche, Chiapas, Colima, Veracruz, San Luis Potosi (in part) *L. celeris* Dejean
35. (30). Pronotum with distinct microsculpture on the dorsal discal area 36
Pronotum with the microsculpture on the dorsal discal areas very fine and obscure or absent 43
36. (35). Striae narrow, microsculpture in trough usually only 1 (sometimes 2) isodiametric units wide (Fig. 13) 37
Striae wide, microsculpture in trough at least 2 and usually 3–4 isodiametric units wide (Figs. 12; 14; 15) 22. *L. floridanus* LeConte
37. (36). Inner surface of hind coxae with microsculpture usually weak very fine elongate parallel lines (Fig. 22); pronotum never explanate 38
Inner surface of hind coxae with distinct isodiametric microsculpture (Fig. 21); basal and lateral margin of pronotum explanate (in part) 23. *L. agilis* (Dejean)
38. (37). Males 39
Females keyed to this couplet belong to one of the following species: *L. aduncus*, *L. parallelus*, *L. cervicalis*, *L. taeniatus*, *L. spinilunatus*.
39. (38). Apex of median lobe not turned apically 40
Apex of median lobe turned apically (Fig. 124 A) 24. *L. aduncus* New Species
40. (39). IS without a secondary sac protruding from the left lateral side 41
IS with a secondary sac protruding from the left lateral side (Fig. 120 A) (in part) 25. *L. parallelus* New Species
41. (40). IS with one or two distinct scale groups on the ventral surface 42
IS without distinct scale groups on the ventral surface, although some groups may partially touch the ventral surface (Figs. 127 A, B) *L. taeniatus* LeConte
42. (41). IS with two distinct scale groups on ventral surface basal group oriented obliquely, apical group oriented transversely (Figs. 130 A, B, C) 26. *L. cervicalis* Casey
IS with one distinct scale group on ventral surface (Figs. 132 A, B) 27. *L. spinilunatus* New Species

43. (35). Specimens from Mexico or West Indies 44
 Specimens from U. S. 45
44. (43.) Specimens from Mexico 15. *L. yeariani* New Species
 Specimens from Cuba 28. *L. nocticolor* Darlington
45. (43). Striae narrow, microsculpture in trough usually 1 (sometimes 2)
 isodiametric units wide (Fig. 13) 46
 Striae wider, microsculpture in trough at least 2 and usually 3-4
 or more isodiametric units wide (Figs. 12; 14; 15) (in part)
 *L. rectus* (Say)
46. (45). Microsculpture on inner surface of hind coxae if present, fine
 elongate parallel lines (Fig. 22); median lobe not compressed
 dorso-ventrally 47
 Microsculpture on inner surface of hind coxae isodiametric; (Fig.
 21); median lobe compressed dorso-ventrally, sinuate on the
 right lateral margin near the apex (Fig. 125)
 23. *L. agilis* (Dejean)
47. (46). Males 48
 Females keyed to this couplet belong to one of the following species:
L. rossi, *L. algidus*, *L. parallelus*, *L. unilobus*, *L. taeniatus*, *L.*
velox.
48. (47). Gonopore opening on the left lateral surface of the IS 49
 Gonopore opening on the right lateral surface of the IS at or near
 the apex (Figs. 126 A, B) 29. *L. rossi* New Species
49. (48). Apex of median lobe not modified 50
 Apex of median lobe indented (Figs. 134 A, B)
 52. *L. velox* (Dejean)
50. (49). IS with a secondary sac everting on the left lateral surface (Figs.
 120 A; 133 A) 51
 IS without a secondary sac everting on the left lateral surface (Figs.
 123 A; 127 B) 52
51. (50). 5 distinct scale groups present on the IS (Figs. 133 A, B, C)
 30. *L. algidus* New Species
 7 distinct scale groups present on the IS (Figs. 120 A, B) (in part)
 *L. parallelus* New Species
52. (50). IS with a rather large distinct scale group covering most of the apex
 (Figs. 127 A, B) (in part) *L. taeniatus* LeConte
 IS without a distinct scale group at the apex although very small,
 weakly sclerotized scales may cover the sac's surface (Figs. 123
 A, B) (in part) *L. unilobus* New Species
53. (7). Mentum transverse and with deep, distinct fovae (Fig. 138) 54
 Mentum not transverse, with or without fovae; if fovae are present,
 small and shallow (Fig. 141) 58
54. (53). Dorsal color black (sometimes with a small pale area towards the
 apex of the elytra); posterior angles of pronotum narrowly
 rounded, never turned to the outside 55
 Dorsal color brown; posterior angles obtusely pointed, usually
 turned to the outside (Fig. 40) 31. *L. crenatus* LeConte
55. (54). Males 56
 Females keyed to this couplet belong to one of the following species:
L. micans, *L. vitiosus*, *L. duryi*.

56. (55). IS with a group of scales on the ventral surface in the basal $\frac{1}{2}$ on the midline, more or less lying between two lateral groups of scales (Figs. 109 E; 110 C) 57
 IS without a distinct scale group on the ventral surface (Figs. 108 A, B, C) 32. *L. micans* Chaudoir
57. (56). IS with a secondary sac everting near the apex on the left lateral surface, the apex of which is covered with a distinct scale group (Figs. 110 A, B, C) 33. *L. vitiosus* New Species
 IS without a secondary sac, although a small lobe may appear to be present: if so, the apex of the lobe is never covered with a distinct scale group (Figs. 109 A, B, C, D, E, F) 34. *L. duryi* Wright
58. (53). Elytra bicolored (discolored areas on the humeri and sometimes near the apex) 59
 Elytra unicolorous 61
59. (58). Lateral margins of pronotum broadly explanate posteriorly, posterior angles narrowly rounded but not acute (Fig. 26); IS with 2 parallel rows of very large spines extending the entire length of the sac (Figs. 83 A, B) 35. *L. spinigrandis* New Species
 Lateral margin of pronotum not explanate posteriorly, posterior angles acute; IS with or without distinct scale groups but never with spines 60
60. (59). Lateral and basal margins of pronotum coarsely and profusely punctate (Figs. 29 A, B); IS of males elongate, more or less an evenly rounded tube, entirely covered with small scales (Fig. 82 A) 36. *L. discolor* New Species
 Lateral and basal margins of pronotum punctate but not as coarse or as numerous as in *L. discolor* (Figs. 27 A, B); IS an elongate tube convoluted towards the apex and with a small bulbous projection on the right side at the midpoint, some surface areas lacking scales (Figs. 86 A, B) (in part) *L. whiteheadi* New Species
61. (58). Pronotum with the hind angles broadly rounded (Figs. 36 A, B; 37 A, B; 38 A, B; 43 A, B; 44 A, B) 62
 Pronotum with the hind angles rounded or not but not broadly rounded 66
62. (61). Metasternum coarsely and distinctly punctate over a large area toward the lateral margin 63
 Metasternum punctate or not, if so then only a few shallow punctures, never coarse punctures (in part) *L. pravitubus* New Species
63. (62). Lateral margins of pronotum near basal angles distinctly explanate 37. *L. saphyrinus* (Chaudoir)
 Lateral margins of pronotum near basal angles not explanate 64
64. (63). Smaller, total length not greater than 10.0 mm. 65
 Larger, total length not less than 10.2 mm. (in part) *L. rectus* (Say)

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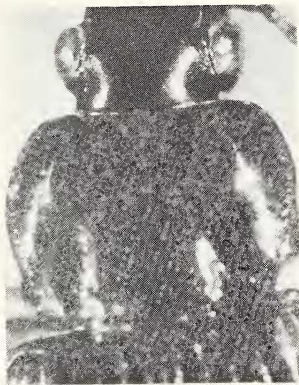
FIGS. 25-28. Prothorax, dorsal aspect. 25. *L. balli* n. sp. 26. *L. spinigrandis* n. sp. 27 A. *L. whiteheadi* n. sp. 27 B. Same, close-up of hind angle. 28 A. *L. elnae* n. sp. 28 B. Same, close-up of hind angle.



25 L. BALLI



26 L. SPINIGRANDIS



27A L. WHITEHEADI



27B



28A L. ELNAE



28B

65. (64). Lateral margins of pronotum evenly rounded giving the pronotum a more rotund appearance; basal angles broadly rounded (Figs. 37 A, B); IS distinctly turned to the left side, without scale groups on the ventro-lateral margins at the base of the sac (Fig. 105) *L. lucens* (Chaudoir)
- Lateral margins of pronotum less rounded basally, pronotum less rotund, posterior angles more distinct than in *L. lucens* (Figs. 38 A, B); IS elongate, not turned to the left side with 1 elongate scale group on the ventro-lateral margin on each side at the base of the sac (Fig. 107) 39. *L. uniformis* New Species
66. (61). Pronotum with hind angles more or less acute; species with a total length not less than 8 mm. 67
- Pronotum with hind angles rounded (Figs. 65 A, B); species with a total length not greater than 7 mm. ... 40. *L. minutus* New Species
67. (66). Pronotum with distinct microsculpture AND/OR the IS with a large distinct secondary sac everting on the right lateral surface near the apex, sclerotized ring on the secondary sac (Figs. 99 A, B) ... 68
- Pronotum without distinct microsculpture (sometimes vaguely present); IS without a large secondary sac on the right lateral surface near the apex 70
68. (67). Males 69
- Females keyed to this couplet belong to one of the following species:
L. velocipes, *L. inferus*.
69. (68). Five distinct scale groups on the IS (Figs. 99 A, B) 41. *L. velocipes* Casey
- Four distinct scale groups on the IS 42. *L. inferus* New Species
70. (67). Lateral margin of pronotum sinuate posteriorly (Figs. 45; 46; 48; 70 A, B); IS without parallel scale groups at the base on the dorsal or ventral surface or if with parallel scale groups then an elongate secondary sac everting on the left lateral surface (Fig. 101 A) 71
- Lateral margin of pronotum not at all sinuate posteriorly, evenly rounded; IS with parallel scale groups at the base on the dorsal or ventral surface without an elongate secondary sac (Fig. 102 D) 74
71. (70). Basal impressions of pronotum continuous with a secondary posterior marginal sulcus (Figs. 5; 70 A, B); specimens from Central America 43. *L. remotus* New Species
- Basal impressions of pronotum not continuous with a secondary posterior marginal sulcus; specimens from the Continental United States 72
72. (71). IS with an elongate secondary sac everting on the left lateral surface (Fig. 101 A); width of pronotum 3.4 mm. or more 44. *L. brevicollis* (LeConte)

→

FIGS. 29-32. Prothorax, dorsal aspect. 29 A. *L. discolor* n. sp. 29 B. Same, close-up of hind angle. 30 A. *L. celeris* (Dej.). 30 B. Same, close-up of hind angle. 31. *L. rectangulus* LeC. 32. *L. elongatus* n. sp.



29A L. DISCOLOR



29B



30A L. CELERIS



30B



31 L. RECTANGULUS



32 L. ELONGATUS

- IS without an elongate secondary sac everting on the left lateral surface; width of pronotum 3.3 mm. or less 73
73. (72). Specimen usually larger; TL—9.6, WH—1.9, WP—3.0, WW—3.9; IS elongate without a secondary sac (Figs. 95 A, B) 45. *L. erraticus* (Dejean)
- Specimens usually smaller, TL—8.6, WH—1.5, WP—2.6, WW—3.0; IS not elongate, with a bulbous secondary sac everting on the left lateral surface (Figs. 96 A, B; 97) .. 46. *L. gibbus* New Species
74. (70). Males 75
- Females keyed to this couplet belong to one of the following species:
L. nitidulus, *L. minor*, *L. cincinnatiensis*, *L. robustus*, *L. circulus*.
75. (74). IS with two elongate groups of scales lying parallel to one another on the dorsal surface in the basal $\frac{1}{2}$ 76
- IS without two parallel groups of scales on the dorsal surface in the basal $\frac{1}{2}$ (one elongate group may be present on the left side but never a matching group on the right side) 78
76. (75). IS with 5 or 6 distinct scale groups 77
- IS with 4 distinct scale groups (Figs. 118 A, B) 48. *L. robustus* New Species
77. (76). IS with 5 distinct scale groups (Fig. 116) 49. *L. cincinnatiensis* Casey
- IS with 6 distinct scale groups (Fig. 117) ... 50. *L. minor* Chaudoir
78. (75). IS with 5 distinct scale groups excluding a group of very elongate, slender scales near the sclerotized ring .. 47. *L. nitidulus* LeConte
- IS with 6 or 7 distinct scale groups excluding a group of very elongate scales near the sclerotized ring which may or may not be present 51. *L. circulus* New Species

1. *Loxandrus infimus* Bates

Figs. 3; 33; 71 A, B; 144

Loxandrus infimus Bates 1881:87. *Lectotype* (here selected). ♂. The data label lists the specimen from Cubilguitz, Vera Paz. Collected by Champion. One additional specimen is in the syntypic series (BM). This does not agree with Bates' description in which he stated there was a male and a female.

L. mutans Darlington 1935:180. *Holotype*. ♂. Type No. 22022. Haiti, Etang Lachau.

DESCRIPTION: *Color.* Dorsal: black, dull, not shining, apex of elytra in some specimens orange or light brown. Ventral: black to

→

FIGS. 33–36. Prothorax, dorsal aspect. 33. *L. infimus* Bates. 34. *L. sculptilis* Bates. 35 A. *L. pactinullus* n. sp., close-up of hind angle. 35 B. Same. 36 A. *L. saphyrinus* (Chaud.), close-up of hind angle. 36 B. Same.



33 L. INFIMUS



34 L. SCULPTILIS



35A L. PACTINULLUS



35B



36A L. SAPHYRINUS



36B

dark brown; last abdominal segment sometimes light brown. Appendages: dark to light brown, occasionally black. *Head*. Clypeus: anterior margin straight. Epistomal suture: distinct, complete. Subgenal suture: obscure or absent. Frontal sulci: obscure or absent. Microsculpture: clypeus, frons and vertex absent. Mentum: apex of lobes rounded; tooth distinct, slightly shorter than lobes; furrows shallow; fovae absent; microsculpture isodiametric. *Thorax*. Pronotum: microsculpture elongate on disk, isodiametric along the lateral margins and posteriorly; lateral margins sinuate posteriorly; posterior angles subacute; anterior marginal sulcus complete; posterior marginal sulcus incomplete; median sulcus reaching anterior marginal sulcus but not posterior margin; basal impressions short, broad, punctate, area between basal impressions punctate; area between basal impressions and lateral margins sparsely punctate posteriorly. Scutellum: apex pointed; microsculpture isodiametric. Prosteronum: microsculpture elongate medially, isodiametric laterally; impunctate. Proepisternum and Proepimeron: microsculpture isodiametric; impunctate. Mesosternum: microsculpture elongate; impunctate. Mesepisternum: Microsculpture isodiametric; anterior quarter punctate. Metasternum: microsculpture elongate medially, isodiametric laterally; impunctate. Metepisternum and Metepimeron: microsculpture isodiametric; impunctate. *Legs*. Hind coxae: microsculpture on inner surface isodiametric. Tarsal segments: 1-3 of middle and hind tarsi grooved dorso-laterally. *Elytra*. Microsculpture on intervals distinct, isodiametric; all striae distinct, punctate, trough 1-2 isodiametric units wide; internal plica well developed, weakly developed, or absent; humeri rounded; microsculpture of epipleura isodiametric. *Abdominal sternites*. Microsculpture elongate medially, isodiametric laterally, impunctate; segments 1-5 rugose laterally. *Aedeagus*. Median lobe: apical half to quarter enlarged. Internal sac: everts medially; a scale group developed at apex of sac; most of the remainder of surface covered with small scales; sclerites absent; sclerotized ring absent. *Measurements*. (18 specimens). TL—7.4 (6.3-8.0); WH—1.5 (1.3-1.7); WP—2.2 (1.8-2.3); WW—2.9 (2.4-3.3).

DISTRIBUTION. Central and South America.

LOCALITIES. MEXICO. Colima: 16.5 mi. E. Colima, Rte. 110, 1900 ft. (GB); Colima, Rte. 110, 1500 ft. (GB); 8 mi. S. W. Colima (GB). Guerrero: 30.8 mi. N. Zumango del Rio, Rte. 95, 1900 ft. (GB). Michoacan:

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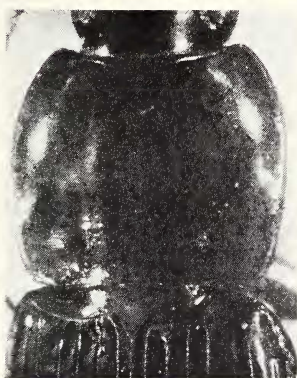
FIGS. 37-40. Prothorax, dorsal aspect. 37 A. *L. lucens* Chaud. 37 B. Same, close-up of hind angle. 38 A. *L. uniformis* n. sp. 38 B. Same, close-up of hind angle. 39. *L. micans* Chaud. 40. *L. crenatus* LeC.



37A L LUCENS



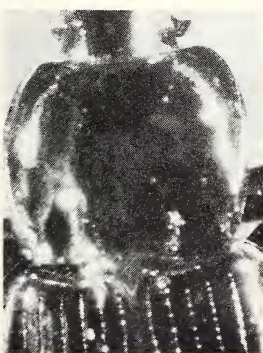
37B



38A L UNIFORMIS



38B



39 L MICANS



40 L CRENATUS

15 mi. W. La Piedad (GB). Morelos: Tejalpa (GB). Quintana Roo: 15.3 mi. W. Chetumal, 100 ft. (GB). Sinaloa: Mazatlan (GB). Sonora: El Oasis, Rte. 15 (GB). Tabasco: San Juan Bautista (BM). Tamaulipas: 73.1 mi. N. Manuel, 200 ft. (GB). UNITED STATES. Texas. Cameron; Brownsville (Darlington, 1935). WEST INDIES. Haiti. Etang Lachaux; swamps north of Dessalines; Damien (near Port-au-Prince) (MCZ). *Cubilguitz, Vera Paz (BM).

COMMENTS. This species resembles *L. sculptilis* and *L. perplexus* in external appearance. It can readily be separated from them by the absence of foveae on the mentum, by the sinuate lateral margins of the pronotum, and by the more acute posterior angles of the pronotum. I have seen one specimen of this species from Brazil. Two specimens I examined were collected in New Orleans, Louisiana (USNM) but were intercepted on banana debris from Mexico. Darlington (1938) recorded this species from Brownsville, Texas. Darlington (1935) described *L. mutans*, a synonym of *L. infimus*, from Haiti. There were 19 paratypes in the material he studied from three different localities. He states that "My specimens were taken under trash and in loose soil a little above water level beside standing water." The remainder of the specimens I have examined were collected in Mexico. Csiki's Catalogue also records this species from Guatemala. Collecting data shows that the species has been collected in the months of April, June, July, August, September, October, and November. It has occasionally been taken at lights.

2. *Loxandrus pactinullus* New Species

Figs. 35 A, B; 93 A, B, C; 154

HOLOTYPE. ♂. MEXICO. Michoacan: 8.1 mi. E. Villamar, Rte. 15, 5500 ft., July 31, 1966. George E. Ball and D. R. Whitehead, Collectors (MCZ). Paratypes. 12 ♂♂ 8 ♀♀ (GB); 1 ♀ 1 ♂ (UA); 1 ♂ (BM).

DESCRIPTION. *Color*. Dorsal: black to dark brown. Ventral: dark to light brown. Appendages: usually light brown, sometimes dark. *Head*. Clypeus: anterior margin straight. Epistomal suture: distinct, complete. Subgenal suture: present or absent. Frontal sulci: obscure or absent. Microsculpture: clypeus, frons and vertex distinct, isodiametric. Mentum: apex of lobes narrowly rounded; tooth distinct, as long as lobes; furrows present, shallow; foveae deep; microsculpture isodiametric. *Thorax*. Pronotum: microsculpture elongate

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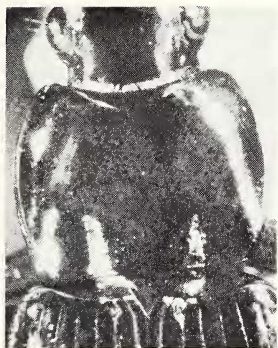
FIGS. 41–44. Prothorax, dorsal aspect. 41. *L. vitiosus* n. sp. 42. *L. duryi* Wright. 43 A. *L. rectus* (Say). 43 B. Same, close-up of hind angle. 44 A. *L. pravitubus* n. sp. 44 B. Same, close-up of hind angle.



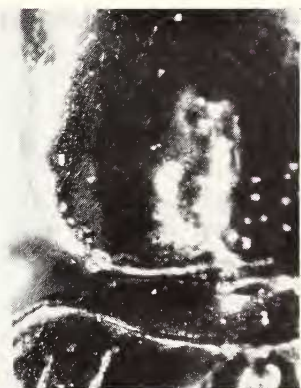
41 L. VITIOSUS



42 L. DURYI



43A L. RECTUS



43B



44A L. PRAVITUBUS



44B

on the disk, isodiametric along the lateral margins and posteriorly; lateral margins punctate, not sinuate posteriorly; posterior angles weakly pointed; anterior marginal sulcus complete; posterior marginal sulcus present, never complete; median sulcus may or may not reach the anterior and/or posterior sulci; basal impressions shallow, short, punctate; area between basal impressions punctate (more so than in *L. sculptilis* Bates); area between basal impressions and lateral margins punctate. Scutellum: apex narrowly rounded; microsculpture distinct, isodiametric. Prosternum: microsculpture elongate medially, isodiametric laterally; impunctate. Proepisternum and Proepimeron: microsculpture isodiametric; impunctate. Mesosternum: microsculpture elongate; impunctate. Mesepisternum: microsculpture isodiametric; impunctate. Metasternum: microsculpture elongate medially, isodiametric laterally; impunctate. Metepisternum: microsculpture isodiametric; impunctate. Metepimeron: microsculpture elongate; impunctate. *Legs*. Hind coxae: microsculpture on inner surface isodiametric. Tarsal segments: 1–3, sometimes 4, of middle and hind tarsi grooved dorso-laterally. *Elytra*. Microsculpture on intervals distinct, isodiametric; all striae distinct, trough 1–2 isodiametric units wide; internal plica weakly developed or absent; humeri rounded; microsculpture of epipleura isodiametric. *Abdominal sternites*. Microsculpture elongate medially, isodiametric laterally; impunctate; segments 1–4 rugose laterally. *Aedeagus*. Median lobe: not modified. Internal sac: everts medially; scales present but no distinct scale groups; sclerites absent; the ring is a very elastic process but not sclerotized. *Measurements*. (19 specimens). TL—8.0 (7.8–8.6); WH—1.7 (1.6–1.9); WP—2.7 (2.6–2.9); WW—3.3 (2.9–3.5).

DISTRIBUTION. Mexico.

LOCALITIES. MEXICO. Colima: 16.5 mi. E. Colima, Rte. 110, 1900 ft. (GB). Michoacan: 8.1 mi. E. Villamar, Rte. 15, 5500 ft. (GB). Morelos: Cuatla (GB); Cuernavaca (GB); Tejalpa (GB). Sonora: El Oasis, Rte. 15 (GB).

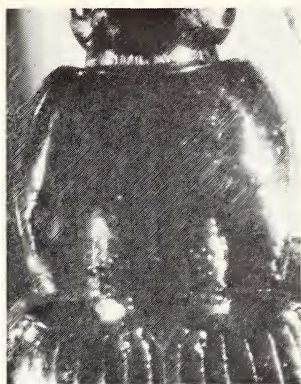
DISCUSSION. This species is similar to *L. infimus* but can be readily separated from that species by the absence of fovae on the mentum. *L. pactinullus* agrees in most external characters with *L. sculptilis* but the latter species is considerably smaller. Bates confused this species with *L. sculptilis* and it is probably misidentified in most collections.

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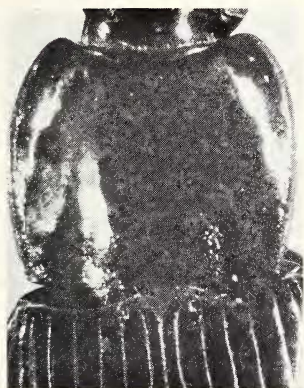
FIGS. 45–50. Prothorax, dorsal aspect. 45. *L. erraticus* (Dej.). 46. *L. gibbus* n. sp. 47. *L. velocipes* Casey. 48. *L. brevicollis* (LeC.). 49. *L. nitidulus* (LeC.). 50. *L. circulus* n. sp.



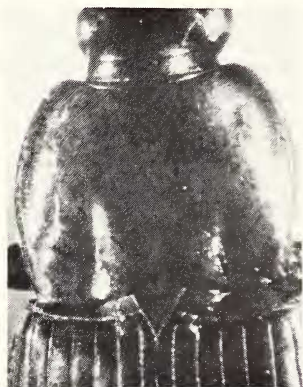
45 L. ERRATICUS



46 L. GIBBUS



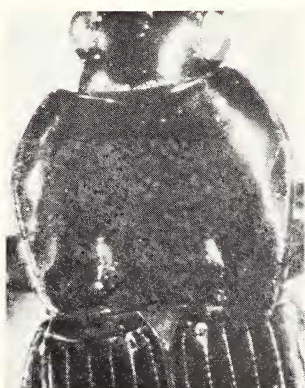
47 L. VELOCIPES



48 L. BREVICOLLIS



49 L. NITIDULUS



50 L. CIRCULUS

It also resembles some Agonini due to the absence on the elytra of the internal plica in some specimens. For further comments see the description of *L. sculptilis* and *L. pacticnullus*. It is known only from Mexico where it has been collected during the months of June, July, and August.

3. *Loxandrus sculptilis* Bates

Figs. 34; 91 A, B; 153

Loxandrus sculptilis Bates, 1881:278. *Lectotype* (here designated). ♂. The data label gives the following information: Tole, Panama, Champion (Collector) (BM). Four additional specimens are marked as syntypes in the BM collection. This does not agree with Bates' description which listed only a male and female.

DESCRIPTION. This species resembles *L. pacticnullus* in all characters except the following: (1) furrows on the mentum are absent; (2) the posterior areas of the pronotum are not as densely punctate; (3) the posterior marginal sulcus of the pronotum is sometimes complete; (4) the species is smaller in almost all respects. A comparison of size ranges follows:

	TL	WH	WP	WW
<i>L. sculptilis</i>	5.8–7.3	1.3–1.5	1.9–2.2	2.5–2.9
<i>L. pacticnullus</i>	7.8–8.6	1.6–1.9	2.6–2.9	2.9–3.5

The aedeagus is also smaller in *L. sculptilis*.

DISTRIBUTION. Central America.

LOCALITIES. MEXICO. Morelos: Santa Rosa, 3.2 mi. N. Zacatepec, 3100 ft. (GB). Sinaloa: Presidio River vs. Union Sin (USNM). Tamaulipas: 27.5 mi. W. Soto la Marina, 1600 ft. (GB); *1.4 mi. SE. Chamal, 500 ft. (GB); 73.1 mi. N. Manuel, 200 ft. (GB). Chiapas: 7.7 mi. N. Frontera Comalpa, 2600 ft. (GB). Jalisco: 23.2 mi. S. Autlan, 800 ft., Rte. 80 (GB). Colima: Colima, 1500 ft., Rte. 110, at light (GB). Oaxaca: Tehuantepec (RTB). PANAMA. Riqui: Tolé (BM).

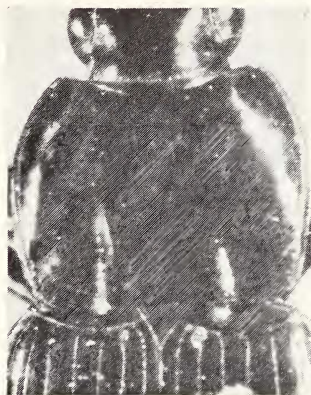
DISCUSSION. This is one of several species of *Loxandrus* that closely resemble some species in the tribe Agonini. The presence of the internal plica is variable and the presence of distinct isodiametric microsculpture on the elytra is unlike most species of *Loxandrus*. It

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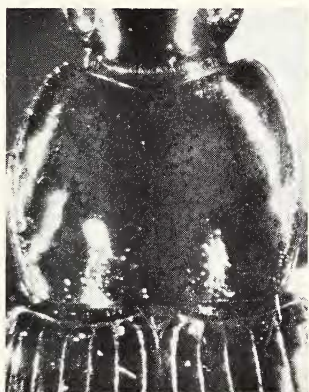
FIGS. 51–56. Prothorax, dorsal aspect. 51. *L. minor* (Chaud.). 52. *L. cincinnatiensis* Casey. 53. *L. robustus* n. sp. 54. *L. saccisecundaris* n. sp. 55. *L. parallelus* Casey. 56. *L. agilis* (Dej.).



51 L. MINOR



52 L. CINCINNATIENSIS



53 L. ROBUSTUS



54 L. SACCISECONDARIS



55 L. PARALLELUS



56 L. AGILIS

shares most characters in common with *L. pactinullus* but can be distinguished from this species by its smaller size. This species has been collected in March, April, June, July, August, September, and October.

4. *Loxandrus rectangulus* LeConte

Figs. 31; 74 A, B; 146

Loxandrus rectangulus LeConte 1878:377. Holotype. ♂. Enterprise, Florida, May 19 (MCZ). One additional specimen in the series, a female. This agrees with LeConte's original description.

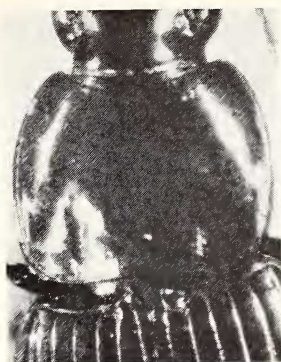
DESCRIPTION. *Color*. Dorsal and ventral: usually black, sometimes dark brown., shining but not iridescent. Appendages: dark to light brown. *Head*. Clypeus: anterior margin straight. Epistomal and subgenal sutures distinct, complete. Frontal sulci: moderately impressed; short, broad. Microsculpture: clypeus, frons and vertex distinct, isodiametric. Mentum: apex of lobes narrowly rounded; tooth distinct, almost as long as lobes; furrows and foveae absent; microsculpture isodiametric. *Thorax*. Pronotum: microsculpture distinct, isodiametric anteriorly, sometimes slightly elongate posteriorly and laterally; lateral margins punctate in the posterior half to quarter, sinuate posteriorly; posterior angles acute; anterior marginal sulcus deep, complete; posterior marginal sulcus reaching past the basal foveae but incomplete; median sulcus distinct, reaching anterior sulcus but not posterior margin; basal impressions moderately deep, elongate, punctate; area between impressions punctate; area between impressions and lateral margins sparsely punctate or not. Scutellum: apex narrowly rounded; microsculpture isodiametric. Ventral surface entirely impunctate, microsculpture elongate, more or less present on all ventral sclerites. *Legs*. Hind coxae: Microsculpture on inner surface elongate. Tarsi: segments 1-4 of hind tarsi, 1-3 and sometimes 4 of middle tarsi grooved dorso-laterally. *Elytra*. Microsculpture present or absent, if present composed of very elongate parallel lines; all striae distinct, punctate, trough 2-4 isodiametric units wide; internal plica well developed; humeri rounded; microsculpture of epipleura isodiametric along the margin, very elongate or absent elsewhere. *Abdominal sternites*. Microsculpture isodiametric laterally, slightly elongate medially; segment 1 sometimes punctate at the base, laterally, other segments impunctate; segments 1-4 sometimes weakly rugose laterally.

→

Figs. 57-62. Prothorax, dorsal aspect. 57. *L. aduncus* n. sp. 58. *L. floridanus* LeC. 59. *L. unilobus* n. sp. 60. *L. taeniatus* LeC. 61. *L. rossi* n. sp. 62. *L. extendus* n. sp.



57 L. ADUNCUS



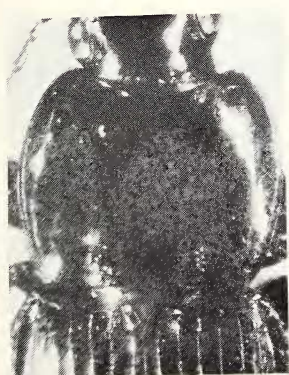
58 L. FLORIDANUS



59 L. UNILOBUS



60 L. TAENIATUS



61 L. ROSSI



62 L. EXTENDUS

Aedeagus. Median lobe: not modified. Internal sac: everts in a median position, very elongate; one distinct scale group present; much of the mid-portion covered by very elongate scales; other areas covered with small, weakly sclerotized scales. Sclerotized ring absent. *Measurements*. (9 ♂ specimens). TL—7.3 (6.7–7.6); WH—1.5 (1.3–1.5); WP—2.1 (1.9–2.2); WW—3.1 (2.8–3.4).

DISTRIBUTION. United States (Southern Florida) and Southern Mexico.

LOCALITIES. MEXICO. Campeche: 14.9 mi. S. Champoton, Rte. 180, 20 ft. (GB). Chiapas: San Quintin, 91°20'–16°24', 700 ft. (GB). Veracruz: .8 mi. W. Sontecomapan, sea level (GB). UNITED STATES. Florida. Highlands Co.: Archbold Bio. Sta., Lake Placid (CU). Manatee Co.: Oneco (GB). Volusia Co.: Enterprise (MCZ). *Texas. An unrecorded locality (MCZ, LeConte Coll.). WEST INDIES. Grand Cayman Island. South Sound (MCZ).

DISCUSSION. This species and *L. elongatus* appear to be alike in all external characters. They can be separated only on characters associated with the male genitalia. *L. rectangulus* has been collected at two localities in Florida while *L. elongatus* is known only from Mexico. Collecting data indicate that *L. rectangulus* has been collected in swamp and marsh habitats. It has been found in February, April and September.

5. *Loxandrus elongatus* New Species

Figs. 32; 72; 145

HOLOTYPE. ♂. MEXICO. Veracruz: 3.6 mi. N. Catemaco, 1000 ft., June 5, 1966. George E. Ball and D. R. Whitehead, Collectors (MCZ). Paratypes. 12 ♂♂ (GB) 1 ♂ (UA).

DESCRIPTION. This species resembles *L. rectangulus* in most external characters. The only distinguishable external difference appears to be in the microsculpture on the intervals of the elytra. In this species the microsculpture is usually evident as fine elongate parallel lines whereas in *L. rectangulus* the microsculpture is always absent. Other distinguishing differences are found in the male genitalia. *Aedeagus*. Median lobe: not modified. Internal sac: everts in a median position and is directed to the left side; a small bulbous secondary sac on the basal quarter of the main sac protruding from

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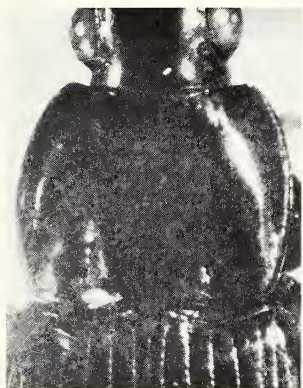
FIGS. 63–67. Prothorax, dorsal aspect. 63. *L. cervicalis* Casey. 64. *L. spinilunatus* n. sp. 65 A. *L. minutus* n. sp. 65 B. Same, close-up of hind angle. 66. *L. algidus* n. sp. 67. *L. lepidus* n. sp.



63 L. CERVICALIS



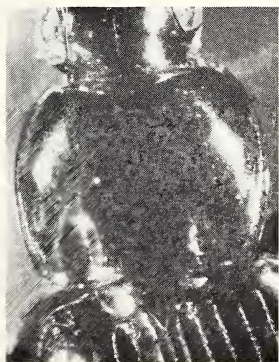
64 L. SPINILUNATUS



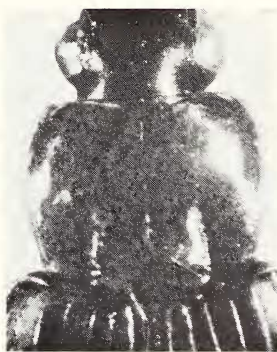
65A L. MINUTUS



65B



66 L. ALGIDUS



67 L. LEPIDUS

the right lateral surface, a small scale group at its apex; no distinct scale groups present on the main sac although the surface is covered with very small weakly sclerotized scales; sclerotized ring absent. *Measurements*. (11 ♂ specimens). TL—7.6 (6.7–8.1); WH—1.5 (1.4–1.6); WP—2.1 (1.8–2.3); WW—3.3 (3.0–3.5).

DISTRIBUTION. Southern Mexico.

LOCALITIES. MEXICO. Chiapas: San Quintin, 91°20'–16°24' (GB); 700 ft. Veracruz: 3.7 mi. N. Catemaco 1000 ft. (GB); 2.5 mi. W. Sontecomapan 100 ft. (GB); .8 mi. W. Sontecomapan (GB).

DISCUSSION. This species has been collected in February, June and September. It closely resembles *L. rectangulus* in external appearances. Females of the two species cannot be separated.

6. *Loxandrus celeris* (Dejean)

Figs. 9; 30 A, B; 75; 147

Feronia celeris Dejean 1828:246. *Lectotype* (here selected). ♂. The first specimen in a series of four specimens in the Paris Museum. The locality label lists it from Boreal America.

Loxandrus rapidus Chaudoir 1868:344. *Lectotype* (here selected). ♂. The first specimen in a series of three specimens in the Paris Museum. The specimen bears no data labels on the pin but the Chaudoir determination label lists it from Louisiana.

DESCRIPTION. This species is like *L. cubanus* Tschitscherine in all external characters except the following: (1) the microsculpture on the pronotum is not as distinct; (2) the microsculpture on the mesepisternum is isodiametric in the anterior half and elongate or absent in the posterior half. *Aedeagus*. Median lobe: not modified. Internal sac: everts medially; slightly directed to the right side; one elongate, well developed scale group on the ventral surface at the base of the sac; remainder of the sac's surface covered with small weakly sclerotized scales; sclerotized ring absent. *Measurements*. (20 specimens). TL—6.8 (6.1–7.2); WH—1.4 (1.3–1.5); WP—2.1 (1.9–2.2); WW—2.8 (2.6–3.1).

DISTRIBUTION. Southern United States and Southern Mexico.

LOCALITIES. MEXICO. Campeche: 14.9 mi. W. Champaton, Rte. 180, 20 ft. (GB); 31.8 mi. E. Escarcega, 200 ft. (GB). Chiapas: 6 mi. W. Cintalapa, Rte. 190, 1950 ft. (GB); San Quintin, 90°20'–16°24', 700 ft. (GB). Colima: 16.5 mi. E. Colima, Rte. 110, 1900 ft. (GB). San Luis Potosi: 1.8 mi. N. El Narajo, 1000 ft. (GB). Veracruz: E. Minatilan, Rte. 180, 60 ft. (GB); 2.5 mi. W. Sontecompan 100 ft. (GB). UNITED STATES. Alabama. Mobile Co.: Mobile (MCZ). Winston Co.: Winston Co. National Forest (CU). Florida. Alachua Co.: Gainesville (FSPB).

Dade Co.: Homestead (FSPB). Duval Co.: Jacksonville (CAS). Highlands Co.: Archbold Biological Station, Lake Placid (PSU, CU). Hillsborough Co.: Tampa (MSU). Jefferson Co.: Monticello (DW). Lucie Co.: Capron (Ft. Capron on an 1861 map) (USNM). Manatee Co.: Oneco (GB). Okeechobee Co.: Shore Lake Okeechobee, 6 mi. S. Okeechobee (GB, CU); Basinger (PU). Orange Co.: Titusville (CNC). Pinellas Co.: Clearwater (CMNH); Dunedin (CU, PU); Royal Palm Park (PU). Sarasota Co.: Myakka River State Park (TLE, GB). St. Johns Co.: St. Augustine (MCZ). Volusia Co.: Enterprise (USNM); New Smyrna (OSU). Unrecorded localities in Florida (OSU, USNM, CU). Georgia. Baker Co.: Emory Univ. Field St., Newton (CU?). Bibb Co.: Macon (TLE); Glynn Co.: St. Simons Island (USNM). Lee Co.: Smithville (CU). Louisiana. Calcasieu Co.: Sabine River Ferry Landing (CU, CAS). Franklin Co.: Chase (UA). Orleans Co.: New Orleans (MCZ, USNM, CAS). Plaquemines Co.: Myrtle Grove (INHS). St. Mary Co.: Franklin (DW). Vermilion Co.: Gueydan (USNM). Unrecorded localities in Louisiana (UM, CAS, AM, USNM). Mississippi. Jackson Co.: Horn Island (CU); Lucedale (CU). South Carolina. Beaufort Co.: no locality (CNC). Texas. Brazos Co.: College Station (TAM). Dallas Co.: Dallas (MCZ). Galveston Co.: Galveston (UK). WEST INDIES. Bahamas. Cat Island: Arthur's Town (MCZ). Grand Cayman: South Sound (MCZ). Inayua (Island?) (MCZ). CUBA. Soledad (MCZ).

DISCUSSION. *L. celeris* resembles *L. cubanus* in most external characters. Identification of females from outside the United States can be made only on the basis of their geographical distribution. Identification of females and males from the United States is based on the shape of the posterior angles of the pronotum and on the aedeagii of males. Specimens from the eastern part of the United States usually have a distinct orange spot near the apex of the elytra while those from farther west usually lack this spot. This species has been collected in all months of the year. It is commonly found in very moist areas and can be collected under leaf debris and by treading. It has also been collected at lights.

7. *Loxandrus cubanus* Tschitscherine

Figs. 68 A, B; 76; 148

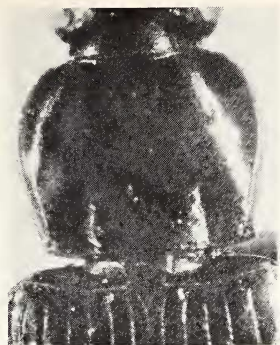
Loxandrus cubanus Tschitscherine 1903:60. *Holotype*. ♂. Brussels Museum of Natural History. *Paratypes*. 1 ♀. Brussels Museum of Natural History.

DESCRIPTION. *Color*. Dorsal: black or dark brown; shining; elytra iridescent; distal area of elytra sometimes with a centrally located orange spot. Ventral: black or dark brown; apex of last abdominal segment usually light brown. Appendages: dark to light brown or straw yellow. *Head*. Clypeus: anterior margin straight or very

slightly concave. Epistomal suture: distinct, complete. Subgenal suture: present or absent. Frontal sulci: obscure, broad, shallow. Microsculpture: clypeus, frons and vertex isodiametric. Mentum: apex of lobes narrowly rounded; tooth distinct, almost as long as lobes (mentum more or less transverse); furrows shallow; fovae, if present, small, shallow; microsculpture isodiametric or slightly elongate. *Thorax*. Pronotum: microsculpture elongate on the disk, isodiametric along the lateral and basal margins and in the basal impressions; lateral margins rounded in the anterior half, more or less tapering in the posterior half, not sinuate, impunctate, posterior angles acute; anterior marginal sulcus present or absent, not complete if present; posterior marginal sulcus reaching well past the basal impressions but incomplete; median sulcus usually not reaching the anterior marginal sulcus, never reaching the posterior margin; basal impressions elongate, moderately deep, sparsely punctate; area between the basal impressions punctate; area between the basal impressions and the lateral margins, if punctate, with only 1 or 2 punctures. Scutellum: microsculpture isodiametric; apex pointed. N. B. Entire ventral surface impunctate. Prosternum: microsculpture elongate medially, isodiametric laterally. Proepisternum and proepimeron: microsculpture slightly to very elongate. Mesosternum: microsculpture elongate. Mesepisternum: microsculpture isodiametric in anterior three quarters, elongate in posterior quarter. Metasternum: microsculpture elongate medially, isodiametric laterally. Metepisternum: microsculpture isodiametric. Metepimeron: microsculpture, if present, very elongate. *Legs*. Hind coxae: microsculpture on inner surface absent or very elongate. Tarsi: segments 1-3 of middle and hind tarsi and sometimes 4 of hind tarsi grooved dorsolaterally. *Elytra*. Microsculpture on intervals absent; all striae distinct, punctate, trough 1-3 isodiametric units wide; internal plica well developed; humeri rounded; microsculpture of epipleura absent. *Abdominal sternites*. Microsculpture distinct, isodiametric laterally, elongate medially; impunctate; segments 1-5 sparsely rugate laterally. *Aedeagus*. Median lobe: not modified. Internal sac: everts medially, strongly turned to the right side; distinct scale groups absent; small, weakly sclerotized scales covering most of the sac's surface; sclerotized ring absent. *Measurements*. (16 specimens). TL—6.0 (5.8-6.4); WH—1.3 (1.2-1.4); WP—1.8 (1.7-2.0); WW—2.5 (2.3-3.1).

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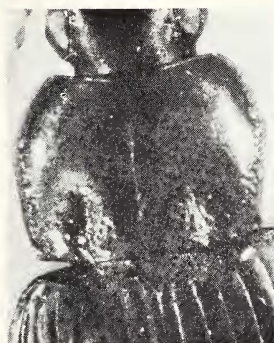
FIGS. 68-70. Prothorax, dorsal aspect. 68. A. *L. cubanus* Tschit. 68 B. same, close-up of hind angle. 69 A. *L. tropicus* n. sp. 69 B. Same, close-up of hind angle. 70 A. *L. remotus* n. sp. 70 B. Same, close-up of hind angle.



68A L. CUBANUS



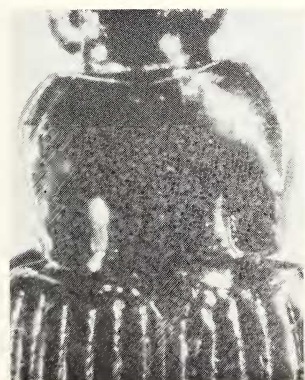
68B



69A L. TROPICUS



69B



70A L. REMOTUS



70B

DISTRIBUTION. Mexico, Central America and West Indies.

LOCALITIES. COSTA RICA. Guanacaste: 5 km. N. Canas (GN). MEXICO. Jalisco: 10.2 mi. NE. La Huerta, Rte. 80, 1200 ft. (GB). Sinaloa: Los Machis (GB). Nayarit: 5.7 mi. E. San Blas, Rte. 46, 140 ft. (GB). Oaxaca: 13.8 mi. W. Zanatepec, Rte. 190, 475 ft. (GB); 1.7 mi. W. Zanatepec, Rte. 190, 300 ft. (GB). WEST INDIES. Bahamas. Arthur's Town (Cat I.) (MCZ); Inagua (MCZ). Cuba. Soledad (Cienfuegos) (MCZ). Oriente: *Aguadores (MCZ). Dominican Republic. Puerto Plata (MCZ), *Sanchez (MCZ). Haiti. Swamps N. of Dessalines (MCZ). Puerto Rico. Guanica Lagoon (MCZ).

DISCUSSION. This species closely resembles *L. celeris*. Females of these two species can only be identified by using geographical data. Specimens from Oaxaca have an orange colored spot near the apex of the elytra. Specimens from other areas in Mexico and Central America lack this spot. Darlington (1934) synonymized this species with *L. celeris*. As I have stated, the external characters of the two species are very similar. The genitalia of the males, however, are distinct. *L. cubanus* has been found in marsh habitats. It has been collected in July and August.

8. *Loxandrus balli* New Species

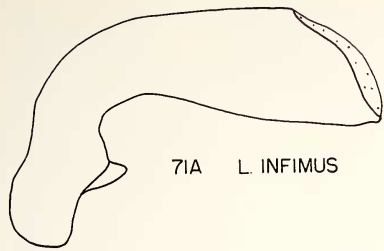
Figs. 25; 88; 151

HOLOTYPE. ♂. MEXICO. Veracruz: 2.5 mi. W. Sontecomapan, 100 ft., September 20–26, 1965. George E. Ball and D. R. Whitehead, Collectors (MCZ). Paratypes: 65 ♂♂ 66 ♀♀ (GB); 1 ♂ 1 ♀ (GN); 1 ♂ 2 ♀♀ (UA); 1 ♀ (BM).

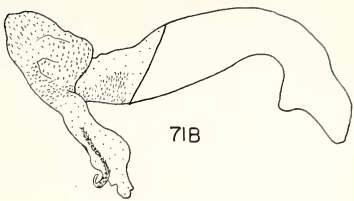
DESCRIPTION. *Color*. Dorsal: black to dark brown, shining; elytron with 1 yellow or orange spot near the humeri and 1 near the apex. Ventral: black to dark brown, apex of last abdominal segment yellow. Appendages: usually pale yellow, sometimes brown or orange. *Head*. Clypeus: anterior margin slightly concave. Epistomal and subgenal sutures: obscure, ill defined. Frontal sulci: obscure; shallow, broad, short. Microsculpture: clypeus, frons and vertex isodiametric. Mentum: apex of lobes narrowly rounded; tooth distinct,

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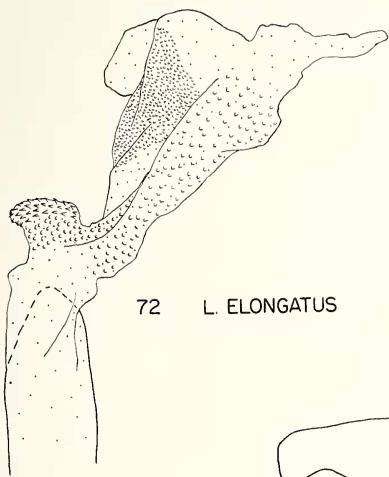
FIGS. 71–74. Male genitalia. 71 A. *L. infimus* Bates, left lateral aspect. 71 B. Same, right lateral aspect, IS everted. 72. *L. elongatus* n. sp., dorsal aspect, IS everted. 73 A. *L. dubius* (Curtis), left lateral aspect. 73 B. Same, left lateral aspect, IS everted. 74 A. *L. rectangularis* LeC., left lateral aspect, IS everted. 74 B. Same, dorsal aspect, IS everted.



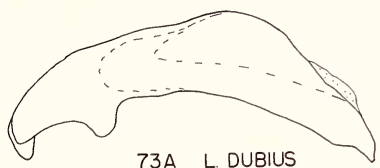
71A L. INFIMUS



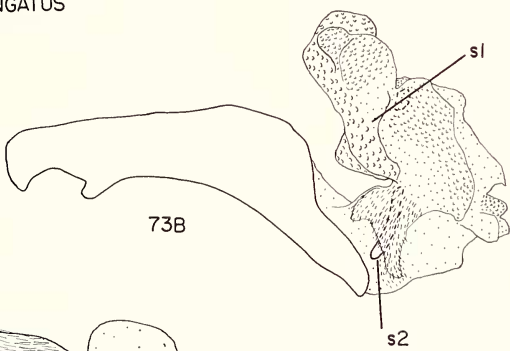
71B



72 L. ELONGATUS



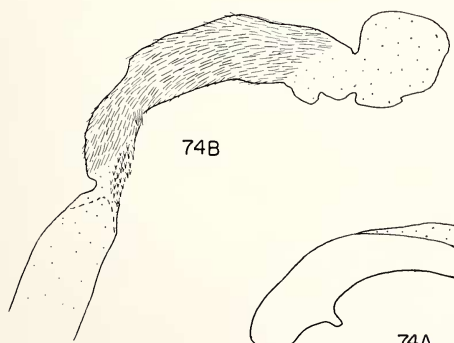
73A L. DUBIUS



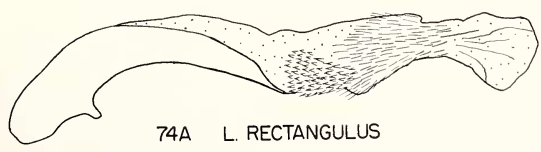
73B

s1

s2



74B



74A L. RECTANGULUS

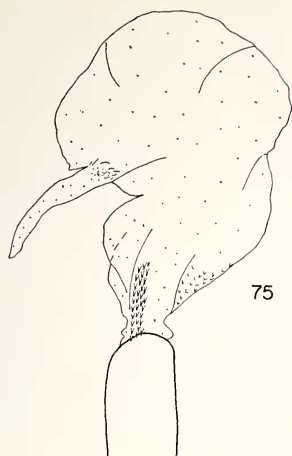
not as long as lobes; furrows shallow; fovae small; microsculpture elongate. *Thorax*. Pronotum: microsculpture absent; lateral margins very slightly sinuate posteriorly, punctate in posterior quarter to half; posterior angles acute; anterior marginal sulcus complete or not; posterior marginal sulcus reaching past the basal impressions but incomplete; median sulcus not reaching anterior marginal sulcus or posterior margin; basal impressions elongate, moderately deep, usually impunctate; area between basal impressions with only 1–2 punctures if punctate; area between basal impressions and lateral margins usually impunctate. Scutellum: microsculpture isodiametric and elongate; apex pointed. N. B. Microsculpture on ventral surface absent except around hind coxae. Prosternum, proepisternum, proepimeron: impunctate. Mesosternum: impunctate. Mesepisternum: weakly punctate in anterior quarter. Metasternum: punctate toward the lateral margin. Metepisternum, metepimeron: impunctate. *Legs*. Hind coxae: microsculpture on inner surface absent. Tarsi: segments 1–3 of middle and hind tarsi grooved dorso-laterally. *Elytra*. Microsculpture on intervals absent; all striae distinct, punctate, trough 1 isodiametric unit wide; internal plica well developed; humeri rounded; microsculpture on epiplura absent. *Abdominal sternites*. Microsculpture vaguely present around metacoxae; segment 1 punctate laterally at the base; segments 1–3 rugate laterally at the base. *Aedeagus*. Median lobe: not modified. Internal sac: everts medially and directed dorsally; 1 elongate scale group on the right lateral surface; most of the sac's surface covered with small weakly sclerotized scales; sclerotized ring absent. *Measurements*. (20 specimens). TL—5.3 (5.1–5.3); WH—1.1 (1.0–1.2); WP—1.6 (1.5–1.7); WW—2.4 (2.5–2.2).

DISTRIBUTION. Mexico and Central America.

LOCALITIES. COSTA RICA. Cartago: Turrialba, IICA Experiment Station (UA). Guanacaste: 5 Km. N. Canas (GN). MEXICO. Chiapas: 11.6 mi. N. Ocozocuautla, 3200 ft. (GB); San Quintin, 90°20'–16°24', 700 ft. (GB); San Quintin, Sierra de la Colmena ca. 300–700 ft. (GB); Palenque Ruins, 400 ft. (GB). Veracruz: 2.5 mi. W. Sontecomapan, 100 ft. (GB); 6.7 mi. NW. Sontecomapan, 200 ft. Coyame, Lake Catemaco (GB).

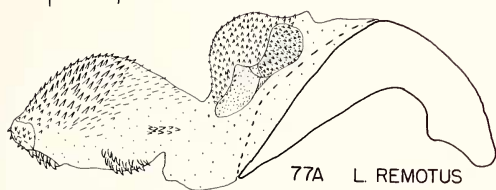
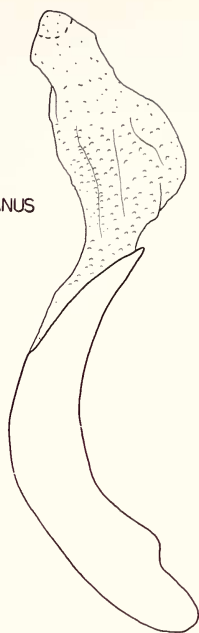
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FIGS. 75–78. Male genitalia, IS everted. 75. *L. celeris* (Dej.), ventral aspect. 76. *L. cubanus* Tschit., left lateral aspect. 77 A. *L. remotus* n. sp., left lateral aspect. 77 B. Same, left lateral aspect. 78 A. *L. subiridescens* M'Leay, ventral aspect. 78 B. Same, dorsal aspect. 78 C. Same, left lateral aspect.

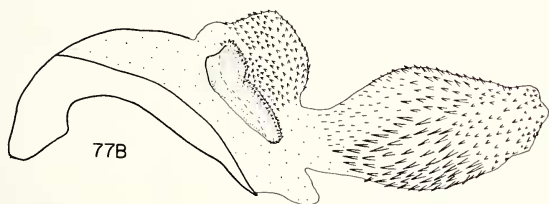


75 L. CELERIS

76 L. CUBANUS



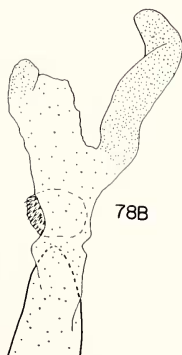
77A L. REMOTUS



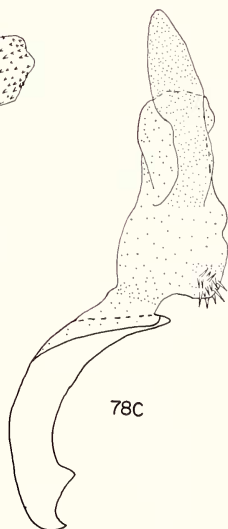
77B



78A L. SUBIRIDESCENS



78B



78C

DISCUSSION. More specimens of this species were collected by Ball and company in Mexico than any other *Loxandrus*. It is a rather small species. The males can be readily identified utilizing the characters associated with the genitalia. The females can usually be identified on the basis of external characters set forth in the key. It has been collected in the months of February, June, July and September in leaf litter and at black lights. It is named in honor of my friend and colleague Dr. George E. Ball whose contributions to the study of Carabidae are without equal.

9. *Loxandrus elnae* New Species

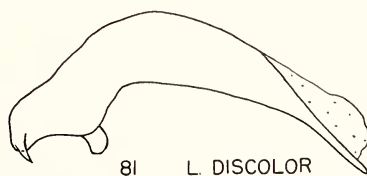
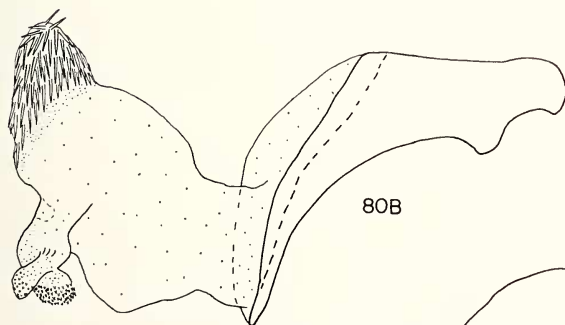
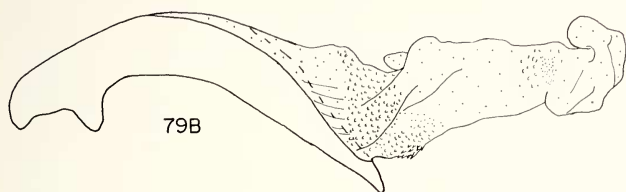
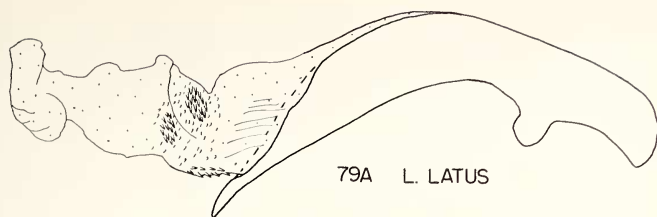
Figs. 28 A, B; 90 A, B; 152

HOLOTYPE. ♂. MEXICO. Chiapas: 32.5 mi. E. Comitan, Rte. 190, 2200 ft., September 3, 1965. George E. Ball and D. R. Whitehead, Collectors (MCZ). Paratypes. 19 ♂♂ (GB); 1 ♂ (UA); 1 ♂ (GN).

DESCRIPTION. *Color*. Dorsal: head and pronotum and background of elytra black to dark brown; elytra various, usually with at least two orange to yellow spots at the humeri and two apically, sometimes the humeral spots greatly elongate reaching or almost reaching the apical spots; labrum and apex of clypeus usually orange or yellow. Ventral: black to dark brown, apex of last abdominal segment usually light yellow. Appendages: brown, apex yellow or light yellow. *Head*. Clypeus: anterior margin straight or slightly concave. Epistomal suture: distinct, complete. Subgenal suture: obscure if present. Frontal sulci: obscure, broad, short, shallow. Microsculpture: clypeus isodiametric. Mentum: apex of lobes acute; tooth distinct, not as long as lobes; furrows shallow; fovae distinct, small; microsculpture elongate. *Thorax*. Pronotum: microsculpture entirely absent; lateral margins punctate in the posterior half, evenly rounded their entire length; posterior angles narrowly rounded: anterior marginal sulcus complete; posterior marginal sulcus complete or not; median sulcus not reaching anterior or posterior marginal sulci; basal impressions elongate, moderately deep, punctate; area between basal impressions sparsely punctate; area between impressions and lateral margins with or without 1-2 punctures. Scutellum: microsculpture isodiametric; apex pointed. N. B. Microsculpture evident only near the pro- and

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FIGS. 79-81. Male genitalia. 79 A. *L. latus* Darl., right lateral aspect, sac everted. 79 B. Same, left lateral aspect, sac everted. 80 A. *L. subrectus* Darl., left lateral aspect, sac everted. 80 B. Same, right lateral aspect, sac everted. 81. *L. discolor* n. sp., left lateral aspect.



metacoxae. Prosternum: impunctate. Proepisternum: sparsely punctate. Proepimeron: impunctate. Mesosternum: impunctate. Mesepisternum: punctate in anterior half to three quarters. Metasternum: punctate toward lateral margins. Metepisternum sparsely punctate or impunctate. Metepimeron: impunctate. *Legs.* Hind coxae: microsculpture on inner surface absent. Tarsal segments: 1-3 of middle and hind tarsi and 4 of hind tarsi grooved dorso-laterally. *Elytra.* Microsculpture absent on the intervals; all striae distinct, punctate, trough 1-2 isodiametric units wide; internal plica well developed; humeri rounded; microsculpture of epipleura absent. *Abdominal sternites.* Microsculpture absent; segment 1 punctate laterally at the base; segments 1-5 rugate laterally. *Aedeagus.* Median lobe: not modified. Internal sac: everts in a median position, distinctly turned dorsally; three distinct scale groups on the main sac; secondary sac everts on the dorsal membranous portion of the median lobe, scale group at the apex; much of the remainder of sac's surface covered with small weakly sclerotized scales; sclerotized ring absent. *Measurements.* (25 specimens). TL—6.8 (5.6-7.4); WH—1.3 (1.2-1.4); WP—2.1 (1.7-2.4); WW—3.0 (2.5-3.3).

DISTRIBUTION. Mexico and Central America.

LOCALITIES. COSTA RICA. Guanacaste: 5 Km. N. Canas (GN). MEXICO. Chiapas: 32.5 mi. E. Comitan, Rte. 190, 2200 ft. (GB); 37.7 mi. E. Comitan, Rte. 190, 2200 ft. (GB); 37.7 mi. E. Comitan, Rte. 190, Rio Chiapa, 2200 ft. (GB). Morelos: Santa Rosa, 3.2 mi. N. Zacatepec, 3100 ft. (GB). Oaxaca: 5 mi. E. Tapanatepec, Rte. 190, 800 ft. (GB).

DISCUSSION. This species closely resembles several other *Loxandrus* species from Mexico and Central America. It can be separated from them only by utilizing characters associated with the aedeagii of the males. It has been collected in the months of April, June, July and September. This species is named in honor of my wife Mrs. Elna Allen.

10. *Loxandrus whiteheadi* New Species

Figs. 27 A, B; 86 A, B; 150

HOLOTYPE. ♂. MEXICO. Chiapas: 32.5 mi. E. Comitan, Rte. 190, 2200 ft., September 4, 1965. G. E. Ball and D. R. Whitehead, Collectors (MCZ). Paratypes: 24 ♂♂ (GB); 2 ♂♂ (RTB); 1 ♂ (UA).

DESCRIPTION. *Color.* Dorsal: head, labrum and clypeus light brown to straw yellow, remainder of head usually black, sometimes dark brown; pronotum, dark to light brown, lateral areas usually lighter in color than disk; elytra, dark brown, an orange or yellow spot near the humerus and toward the apex. Ventral: dark brown, occa-

sionally black, apex of last abdominal segment sometimes yellow. Appendages: dark brown to straw yellow. *Head*. Clypeus: anterior margin slightly concave or straight. Epistomal and subgenal sutures: complete. Frontal sulci: broad, moderately impressed. Microsculpture: clypeus, frons and vertex isodiametric. Mentum: apex of lobes narrowly rounded; tooth distinct, broadly rounded at apex; furrows shallow or absent; foveae present or absent, if present small and puncture-like; microsculpture elongate. *Thorax*. Pronotum: microsculpture absent except along narrowly reflexed lateral margins; lateral margins weakly sinuate posteriorly, punctate in posterior half; posterior angles distinct, acute; anterior marginal sulcus complete; posterior marginal sulcus reaching only to basal impressions; median sulcus not reaching anterior marginal sulcus or posterior margin; basal impressions elongate, moderately deep, punctate; area between impressions and between impressions and lateral margins sparsely punctate. Scutellum: microsculpture isodiametric; apex pointed. N. B. Entire ventral surface without microsculpture. Prosternum: impunctate. Proepisternum: punctate. Proepimeron: impunctate. Mesosternum: impunctate. Mesepisternum: punctate in anterior quarter to half. Metasternum: punctate toward lateral margin. Metepisternum: punctate or not. Metepimeron: impunctate. *Legs*. Hind coxae: microsculpture on inner surface absent. Tarsi: segments 1-3 of middle and hind tarsi grooved dorso-laterally. *Elytra*. Microsculpture on intervals absent; all striae distinct, punctate, trough 2-3 isodiametric units wide; internal plica well developed; humeri rounded; microsculpture on epipleura absent. *Abdominal sternites*. Microsculpture absent; segment 1 punctate and rugose basally towards the lateral margin; segments 2 and 3 weakly rugose laterally. *Aedeagus*. Median lobe: not modified. Internal sac: everts in a median position, directed dorsally; no distinct scale groups present; most of the sac's surface covered with small weakly sclerotized scales; a small bulbous projection on the right dorso-lateral margin of the sac; sclerotized ring absent. *Measurements*. (20 specimens). TL—6.5 (6.0-7.2); WH—1.4 (1.2-1.5); WP—2.0 (1.8-2.2); WW—2.9 (2.6-3.1).

DISTRIBUTION. Central America.

LOCALITIES. GUATEMALA. Escuintla: Zapote. MEXICO. Chiapas: 8 mi. SE. Arriaga (RTB); 32.5 mi. E. Comitán, Rte. 190, 2200 ft. (GB); 0.9 mi. N. Frontera Comalapa, 2100 ft. (GB); 11.6 mi. N. Ocozocauhtla, 3200 ft. (GB). Oaxaca: 5 mi. E. Tapanatepec, Rte. 190, 800 ft. (GB). Veracruz: 2.5 mi. W. Sontecomapan, 100 ft. (GB).

DISCUSSION. *L. whiteheadi* is named in honor of Mr. Don Whitehead. Specimens having a punctate metepisternum can readily be

distinguished on the basis of external characters. Those specimens in which the metepisternum is impunctate cannot be separated from *L. unispinus*, *L. elnae*, *L. fraus*, *L. lepidus*, or *L. tropicus* using external characters. For this reason females have been excluded from the paratype material. *L. whiteheadi* has been collected in the months of June, August, and September.

11. *Loxandrus tropicus* New Species

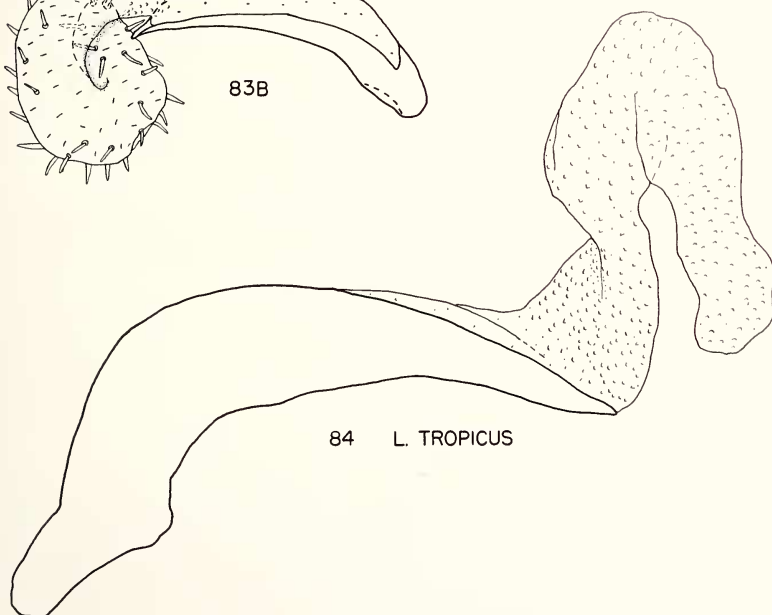
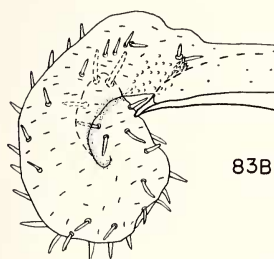
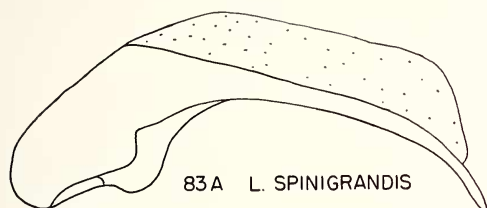
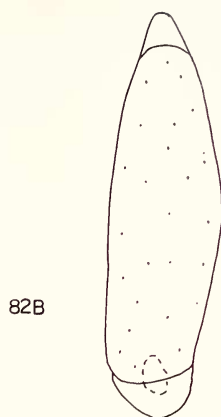
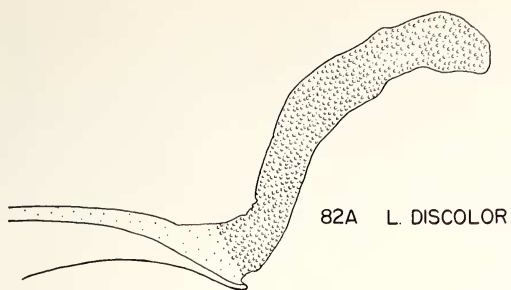
Figs. 69 A, B; 84; 149

HOLOTYPE. ♂. COSTA RICA. Cartago Province; Turrialba. July 11, 1965; R. J. Hampton, Collector (MCZ). Paratypes: 1 ♂ (GN); 1 ♂ (UA).

DESCRIPTION. *Color*. Dorsal surface: shining; head, disk of pronotum and elytra black to dark brown; elytra with two apical and two basal orange to yellow spots; pronotum with lateral areas light brown to straw yellow. Ventral surface: black to dark brown, abdominal segments tinged with yellow. Appendages: light brown to straw yellow. *Head*. Clypeus: anterior margin straight or slightly concave. Epistomal suture: distinct. Subgenal suture: distinct or absent. Frontal sulci: distinct, shallow, short. Microsculpture: clypeus, frons and vertex, distinct, isodiametric. Mentum: apex of lobes rounded; tooth distinct, not as long as lobes; furrows present; fovae present or absent; microsculpture elongate or absent. *Thorax*. Pronotum: microsculpture absent or very elongate, vaguely present only along the lateral margins in the anterior half; lateral margins coarsely punctate in the posterior half to three quarters, tapering evenly to the posterior angles, not sinuate posteriorly; posterior angles pointed; anterior marginal sulcus complete; posterior marginal sulcus complete or not; median sulcus distinct, reaching the anterior and posterior sulci or not; basal impressions distinct, elongate, punctate; basal quarter coarsely punctate. Scutellum: apex pointed; microsculpture distinct, isodiametric. N. B. Entire ventral surface without microsculpture. Prosternum: impunctate. Proepisternum: coarsely but sparsely punctate. Mesosternum: impunctate. Mesepisternum: coarsely punctate anteriorly. Metasternum: coarsely punctate laterally. Metepisternum: punctate or not. Metepimeron: impunctate.

→

FIGS. 82-84. Male genitalia. 82 A. *L. discolor* n. sp., left lateral aspect, apex of median lobe with IS everted. 82 B. Same, dorsal aspect of median lobe. 83 A. *L. spinigrandis* n. sp., left lateral aspect. 83 B. Same, right lateral aspect, IS everted. 84. *L. tropicus* n. sp., left lateral aspect, IS everted.



Legs. Hind coxae: microsculpture on inner surface absent; tarsal segments 1–4 of middle and hind tarsi grooved dorso-laterally. *Elytra.* Microsculpture absent; all striae distinct, trough 2–3 isodiametric units wide; internal plica well-developed; humeri rounded; microsculpture of epipleura absent. *Abdominal sternites.* Microsculpture absent; segment 1 coarsely punctate near the lateral anterior surface; segments 2 and 3 sometimes punctate in the central area; other segments impunctate. *Aedeagus.* Median lobe: apex not modified. Internal sac: everts medially but is turned dorsally and then ventrally and to the left side; no distinct scale groups; most of the surface of the sac is covered by small lightly sclerotized scales; sclerotized ring absent. *Measurements.* (2 ♂ specimens). TL—7.3 (7.1–7.6); WE—1.5 (1.4–1.5); WP—2.3 (None); WW—4.7 (4.6–4.8).

DISTRIBUTION. Central America.

LOCALITIES. COSTA RICA. Cartago: Turrialba (MCZ) (GN).

DISCUSSION. This species is known from Costa Rica. Two males and two females were collected by Mr. R. J. Hampton and donated to Mr. Gary Noonan. The specimens were probably collected on or near the IICA Experiment Station just outside of Turrialba. The external morphological characters are similar to the characters of the other species in this complex. The females can not be separated with any accuracy and are not marked as paratypes.

12. *Loxandrus lepidus* New Species

Figs. 67; 85; 149

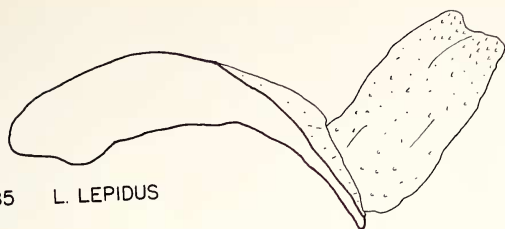
HOLOTYPE. ♂. MEXICO. Veracruz: Fortin de las Flores, June 26–30, 1963, leaf litter. D. R. Whitehead, Collector (MCZ).

DESCRIPTION. *Color.* Dorsal surface: shining, background color black, lateral areas of pronotum and lateral and apical areas of elytra brown; elytra with two apical and two basal orange to yellow spots. Ventral surface: shining, background color black, lateral and apical areas of segments 4 and 5 light brown. Appendages: brown to light brown. *Head.* Clypeus: anterior margin straight. Epistomal and subgenal sutures: distinct, complete. Frontal sulci: distinct, broad,

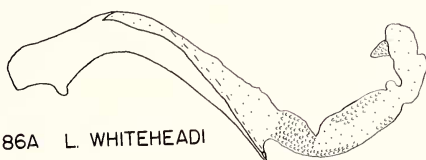
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FIGS. 85–88. Male genitalia. 85. *L. lepidus* n. sp., left lateral aspect. IS everted. 86 A. *L. whiteheadi* n. sp., left lateral aspect, IS everted. 86 B. Same, dorsal aspect, apex of median lobe with IS everted. 87 A. *L. unispinus* n. sp., right lateral aspect, IS everted. 87 B. Same, left lateral aspect. 87 C. Same, dorsal aspect. 88. *L. balli* n. sp., left lateral aspect.

85 L. LEPIDUS



86A L. WHITEHEADI



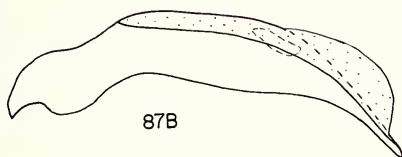
86B



87A L. UNISPINUS



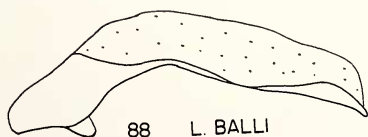
87B



87C



88 L. BALLI



shallow, short. Microsculpture: clypeus, frons and vertex, distinct, isodiametric. Mentum: apex of lobes rounded; tooth distinct, not as long as lobes; furrows present; foveae absent; microsculpture elongate. *Thorax*. Pronotum: microsculpture absent on most of the surface, present only along the reflexed lateral margins; lateral margins weakly punctate, slightly sinuate near the basal angle; posterior angles pointed; anterior marginal sulcus complete; posterior marginal sulcus incomplete; median sulcus present, not reaching anterior or posterior sulci; basal quarter sparsely punctate. Scutellum: apex pointed; microsculpture distinct, isodiametric. N. B. Entire ventral surface without microsculpture. Prosternum: impunctate. Proepisternum: weakly and sparsely punctate. Proepimeron: impunctate. Mesosternum: impunctate. Mesepisternum: punctate in the anterior half to three quarters. Metasternum: punctate toward lateral margin. Metepisternum and Metepimeron: impunctate. *Legs*. Hind coxae: microsculpture on inner surface absent; segments 1–3 of middle and hind tarsi grooved dorso-laterally. *Elytra*. Microsculpture absent; all striae distinct, trough 1 isodiametric unit wide; internal plica well developed; humeri rounded; microsculpture of epipleura absent. *Abdominal sternites*. Microsculpture absent; segment 1 coarsely punctate along the lateral basal margin; segment 2 sparsely punctate laterally; other segments impunctate. *Aedeagus*. Median lobe: apex not modified. Internal sac: everts medially, deflected dorsally. Internal sac: no distinct scale groups; small lightly sclerotized scales cover most of the surface of the sac, somewhat more dense towards apex and in the mid region of the right side; sclerotized ring absent. *Measurements*. (1 specimen). TL—7.3; WE—1.5; WP—2.1; WW—3.3.

DISTRIBUTION. Mexico.

LOCALITIES. MEXICO. Veracruz: Fortin de las Flores (MCZ).

DISCUSSION. This species is known from a single male specimen collected in leaf litter between June 26–30, 1963, by D. R. Whitehead. Its nearest relative appears to be *L. tropicus*. It differs from *L. tropicus* only in the shape of the internal sac of the aedeagus as characterized in the key.

13. *Loxandrus fraus* New Species

Figs. 23 A, B; 89; 152

HOLOTYPE. ♂. MEXICO. Morelos: Santa Rosa, 3.2 mi. N. Zacatepec, 3100 ft. elevation, March 31, 1966. McFadden, Whitehead, Collectors (MCZ). Paratypes: 44 ♂♂ (GB); 1 ♂ (UA).

DESCRIPTION. *Color*. Dorsal: shining, head and elytra black to dark brown, pronotum dark to light brown, elytra with two apical and

two basal orange to yellow spots, spots may sometimes be very elongate. Ventral: usually black to dark brown, sometimes light brown, abdominal segments sometimes tinged with yellow. Appendages: dark brown to straw yellow. *Head*. Clypeus: anterior margin straight or slightly concave. Epistomal and subgenal sutures: distinct, complete. Frontal sulci: obscure, broad, shallow, short. Microsculpture: clypeus, frons and vertex isodiametric. Mentum: apex of lobes narrowly rounded; tooth distinct, not as long as lobes; furrows shallow, broad; foveae small but distinct; microsculpture absent or very elongate. *Thorax*. Pronotum: microsculpture absent even along the lateral margin and in the basal furrows; lateral margins evenly rounded their entire length, not sinuate, punctate in the posterior half to three quarters; posterior angles narrowly rounded; anterior marginal sulcus complete; posterior marginal sulcus complete or not; median sulcus reaching anterior marginal sulcus or not, never reaching posterior marginal sulcus; basal impressions elongate, moderately deep, punctate; area between basal impressions sparsely punctate; area between basal impressions and lateral margins sparsely punctate. Scutellum: microsculpture isodiametric and/or elongate; apex pointed. N. B. Entire ventral surface of the pronotum without microsculpture. Prosternum: impunctate. Proepisternum: sparsely and weakly punctate. Proepimeron: impunctate. Mesosternum: impunctate. Mesepisternum: anterior quarter to half punctate. Metasternum: punctate laterally. Metepisternum: usually impunctate, sometimes with 1–3 obscure punctures. Metepimeron: impunctate. *Legs*. Hind coxae: microsculpture on inner surface absent. Tarsal segments: 1–3 of middle and hind tarsi and 4 of hind tarsi grooved dorso-laterally. *Elytra*. Microsculpture on intervals absent; all striae distinct, punctate, trough 1–2 isodiametric units wide; internal plica well developed; humeri rounded; microsculpture on epipleura absent. *Abdominal sternites*. Microsculpture absent except around hind coxae; segment 1 punctate laterally at the base, other segments impunctate; segments 1–5 sparsely rugose laterally. *Aedeagus*. Median lobe: not modified. Internal sac: everts medially and turned dorsally; two distinct scale groups on the right side; remainder of the sac's surface covered with small weakly sclerotized scales; sclerotized ring absent. *Measurements*. (25 specimens). TL—6.0 (5.6–6.5); WH—1.2 (1.1–1.3); WP—1.8 (1.7–2.0); WW—2.6 (2.5–2.8).

DISTRIBUTION. Mexico.

LOCALITIES. MEXICO. Chiapas: .9 mi. N. Frontera Comalapa, 2100 ft. (GB); 2.9 mi. N. Frontera Comalapa, 2200 ft. (GB); San Quintin, 700 ft., 91°21'–16°24' (GB). Morelos: Santa Rosa, 3.2 mi. N. Zacatepec, 3100 ft. (GB). Nayarit: 5.7 mi. E. San Blas, Rte. 46, 140 ft. (GB); 13.8 mi.

E. San Blas, Rte. 46, 200 ft. (GB). Oaxaca: 5 mi. E. Tapanatepec, Rte. 190, 800 ft. (GB).

DISCUSSION. In external characters this species is most like *L. elnae*. It also resembles *L. tropicus*, *L. balli* and *L. unispinus* and cannot be separated from them using external characters. Determination of females has been based on geographical distribution. *L. fraus* has been collected in the months of February, March, April, June, July, and August.

14. *Loxandrus unispinus* New Species

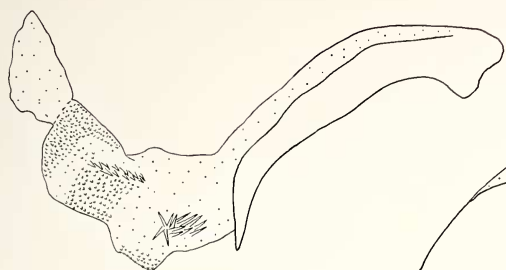
Figs. 1 A, B; 2 A, B; 24 A, B; 87 A, B, C; 150

HOLOTYPE. ♂. CANAL ZONE. Barro Colorado Island: April, 1941. James Zetek, Collector; No. 4781, Lot No. 41-8655 (USNM). Paratypes: 11 ♂♂ (USNM); 2 ♂♂ (UA).

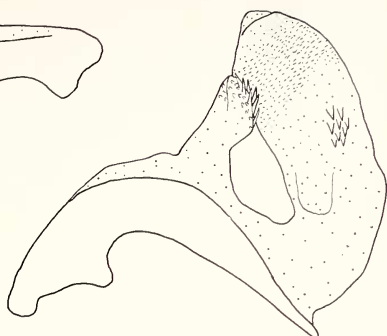
DESCRIPTION. *Color*. Dorsal surface: shining, background color dark to light brown; head usually darker than other parts; disk of pronotum may or may not be darker than lateral areas; elytra with two apical and two basal orange to yellow spots; ventral surface: shining, background color dark to light brown, occasionally tinged with yellow; appendages generally light to dark brown, sometimes straw yellow. *Head*. Clypeus: anterior margin straight. Epistomal and subgenal sutures: distinct, complete. Frontal sulci: distinct, broad, shallow, short. Microsculpture: clypeus, frons and vertex, distinct isodiametric. Mentum: apex of lobes narrowly rounded; tooth distinct, not as long as lobes; furrows present; fovae present or absent; microsculpture absent or very elongate, vaguely present only along the lateral margin in the anterior fifth; lateral margins punctate, slightly sinuate posteriorly; posterior angles pointed; anterior marginal sulcus complete; posterior marginal sulcus complete or not; median sulcus present, reaching the anterior and posterior sulci or not; basal impressions distinct, elongate, sparsely punctate; basal quarter punctate. Scutellum: apex pointed; microsculpture distinct, isodiametric. N. B. Entire ventral surface without microsculpture. Prosternum: impunctate. Proepisternum: usually impunctate, sometimes with a few weak punctures. Proepimeron: impunctate. Mesosternum: impunctate. Mes-

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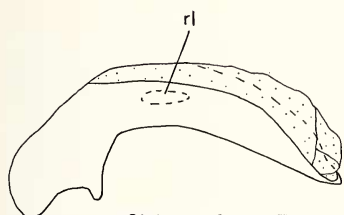
FIGS. 89-92. Male genitalia. 89. *L. fraus* n. sp., right lateral aspect, IS everted. 90 A. *L. elnae* n. sp., left lateral aspect, IS everted. 90 B. Same, right lateral aspect, IS everted. 91 A. *L. sculptilis* Bates, left lateral aspect. 91 B. Same, left lateral aspect, IS everted. 92. *L. negrei* Straneo, left lateral aspect, IS everted.



89 L. FRAUS



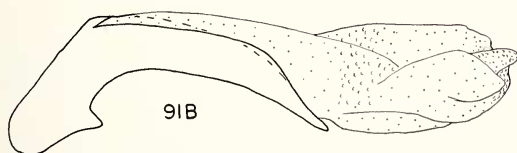
90A L. ELNAE



91A L. SCULPTILIS

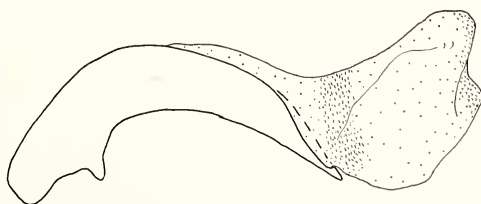


90B



91B

92 L. NEGREI



episternum: coarsely punctate anteriorly. Metasternum: coarsely punctate laterally. Metepisternum: usually impunctate, sometimes with a few weak punctures. Metepimeron: impunctate. *Legs.* Hind coxae: microsculpture on inner surface absent; tarsal segments 1-3 and sometimes 4 of middle and hind tarsi grooved dorso-laterally. *Elytra.* Microsculpture absent; all striae distinct, trough 1 isodiametric unit wide; internal plica well-developed; humeri rounded; microsculpture of epipleura absent. *Abdominal sternites.* Microsculpture absent; segment 1 coarsely punctate near the lateral anterior surface; other segments impunctate. *Aedeagus.* Median lobe: not modified. Internal sac: everts medially, deflected dorsally; one well-developed, distinct, small scale group on right side of sac near the midline; other small scales covering much of the sac's surface; sclerotized ring absent. *Measurements.* (14 specimens). TL—5.7 (5.0-6.1); WE—1.2 (1.1-1.2); WP—1.8 (1.6-1.9); WW—2.5 (2.2-2.8).

DISTRIBUTION. Southern Central America.

LOCALITIES. CANAL ZONE. Albrook Forest, Fort Clayton (UA); Barro Colorado Island (USNM); Corozal (USNM). PANAMA. Pearl Island, San Jose (USNM).

DISCUSSION. This species is presently known only from Panama where it has been collected at light traps in the months of April, May, June and July. The external characters of this species are very similar to those of *L. fraud*, *L. elnae*, *L. tropicus* and *L. lepidus*. No one external character sets it apart from these species though it is generally smaller than any of them. Determination of females has been made by associating them with males having the same collecting data.

15. *Loxandrus yeariani* New Species

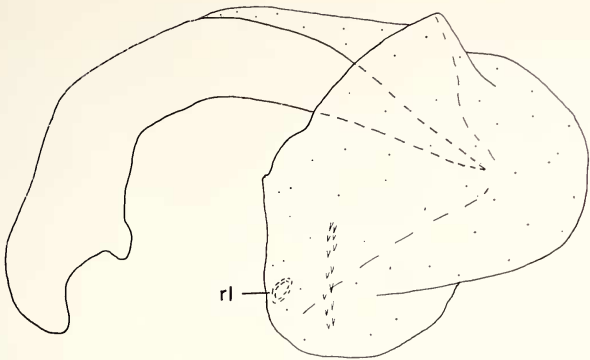
Figs. 119; 169

HOLOTYPE. ♂. MEXICO. Colima: 16.5 mi. E. Colima, 1900 ft., Rte. 110, August 2-3, 1966. G. E. Ball and D. R. Whitehead, Collectors (MCZ). Paratypes: 3 ♂ 4 ♀ (GB).

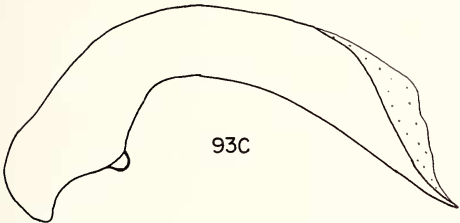
DESCRIPTION. *Color.* Dorsal and Ventral: black, shining. Appendages: usually black, sometimes tinged with brown. *Head.* Clypeus: anterior margin concave. Epistomal and subgenal sutures: distinct, complete. Frontal sulci: obscure, shallow, broad, short.

→

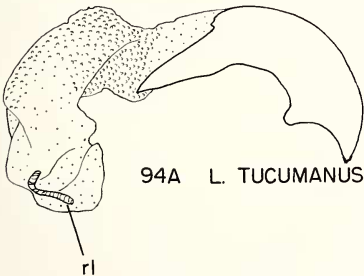
FIGS. 93-94. Male genitalia. 93 A. *L. pactinullus* n. sp., left lateral aspect, IS everted. 93 B. Same, dorsal aspect, 93 C. Same, left lateral aspect. 94 A. *L. tucumanus* (Dej.), right lateral aspect, IS everted. 94 B. Same, left lateral aspect.



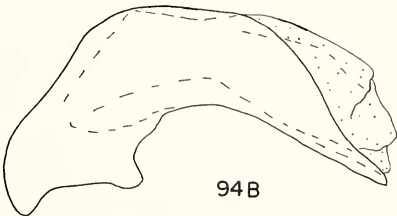
93A L. PACTINULLUS



93B



94A L. TUCUMANUS



94B

Microsculpture: clypeus, frons and vertex weak, isodiametric. Mentum: apex of lobes acute; tooth distinct, broadly rounded; furrows present; fovae present, small; microsculpture distinct, isodiametric. *Thorax*. Pronotum: microsculpture if present, elongate; lateral margins impunctate, broadly rounded; posterior angles absent; anterior marginal sulcus complete; posterior marginal sulcus incomplete; median sulcus barely reaching anterior marginal sulcus, not reaching posterior margin; basal impressions short, narrow, deep; area between impressions punctate; area between impressions and lateral margins sparsely punctate. Scutellum: microsculpture weak, isodiametric; apex pointed. N. B. Entire ventral surface impunctate. Prosteronum: microsculpture elongate medially, isodiametric laterally. Proepisternum: microsculpture where present, elongate. Proepimeron: microsculpture isodiametric. Mesosternum: microsculpture isodiametric. Mesepisternum: microsculpture isodiametric anteriorly, elongate posteriorly. Metasternum: microsculpture isodiametric laterally, absent medially. Metepisternum: microsculpture isodiametric. Metepimeron: microsculpture absent. *Legs*. Hind coxae: microsculpture on inner surface isodiametric. Tarsal segments: 1–3 of middle and hind tarsi grooved dorso-laterally. *Elytra*. Microsculpture on intervals absent; all striae distinct; trough 3–4 isodiametric units wide; internal plica well developed; humeri rounded; microsculpture of epipleura absent. *Abdominal sternites*. Microsculpture mostly isodiametric, obscure and elongate medially on segments 2 and 3; impunctate; segments 1 and 2 rugose along the base laterally. *Aedeagus*. Median lobe: not modified. Internal sac: everts medially and is directed dorsally; 3 distinct scale groups present; 1 large group at the apex of each of 2 secondary sacs, 1 small group on the right lateral surface; most of the remainder of the sac's surface without small weakly sclerotized scales; sclerotized ring present. *Measurements*. (8 specimens). TL—10.5 (9.9–11.3); WH—2.2 (2.1–2.4); WP—3.3 (3.1–3.6); WW—4.1 (3.8–4.4).

DISTRIBUTION. Mexico.

LOCALITIES. MEXICO. Colima: 16.5 mi. E. Colima, Rte. 110, 1900 ft. (MCZ, GB).

DISCUSSION. This is the largest species in the Mexican *Loxandrus* fauna. It is readily recognizable by the broadly rounded lateral margins of the pronotum resulting in the absence of distinct posterior angles. The aedeagus is also characteristic. It is known from only one

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FIGS. 95–96. Male genitalia, IS everted. 95 A. *L. erraticus* (Dej.), left lateral aspect. 95 B. Same, right lateral aspect. 96 A. *L. gibbus* n. sp., right lateral aspect. 96 B. Same, left lateral aspect.

95A L. ERRATICUS



95B



96A L. GIBBUS



96B



locality near Colima, Mexico, and has been collected only in August. It is named in honor of Dr. W. C. Yearian.

16. *Loxandrus rectus* (Say)

Figs. 43 A, B; 98 A, B, C; 157

Feronia recta Say 1823:58. *Neotype*. From Lindroth and Freitag (1969): "No type area given. The neotype agrees with Casey's description (1918, p. 381) and also, except it is larger, with the 7 ex. in coll. Lec. (MCZ). A ♂ with genitalia dissected, from South Carolina, designated by R. T. Allen as neotype and the state as type area."

Feronia lucidula Dejean, 1828:239. *Lectotype* (here selected). A male found mixed with *L. rectus* material but marked with the green Dejean determination label as *Lucidulus* from Boreal America (Paris Museum Nat. Hist.).

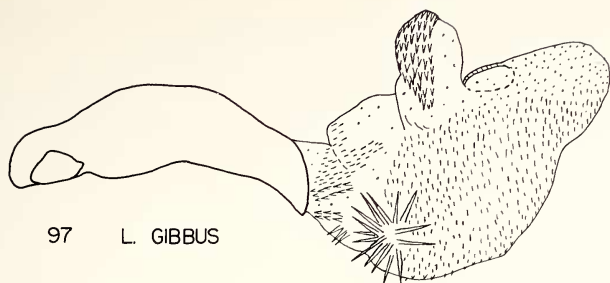
Megalostylus laticollis Chaudoir, 1843:96. *Lectotype* (here selected). A male and a female found mixed with *L. rectus* material belonging to the Chaudoir collection. The male bears a *Laticollis* Chaudoir determination label from Louisiana. The female bore no labels (Paris Museum Nat. Hist.).

Loxandrus rectus sub. sp. *mandibularis* Casey, 1918:382. *Type*. Male from the District of Columbia. Type No. 47334 (USNM).

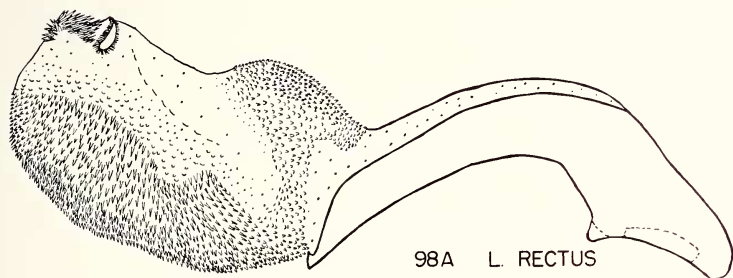
DESCRIPTION. *Color.* Body entirely black, iridescent; appendages, dark brown to black. *Head.* Clypeus: anterior margin slightly concave (distinctly notched in one specimen). Epistomal and subgenal sutures: distinct, complete. Frontal sulci: shallow, broad, obscure. Microsculpture: clypeus, frons and vertex distinct, isodiametric. Mentum: apex of lobes pointed; tooth distinct, shorter than lobes, rounded at apex; furrows weak; foveae absent; microsculpture elongate lines if present. *Thorax.* Pronotum: microsculpture absent on the disk, isodiametric in the reflexed lateral margins, sulci, and basal furrows; lateral margins impunctate, evenly rounded their entire length, not sinuate posteriorly; posterior angles rounded; anterior marginal sulcus usually present and complete; posterior marginal sulcus incomplete; median sulcus present, reaching anterior marginal sulcus but not posterior margin; basal impressions distinct, elongate and broad, punctate; area between basal impressions sometimes

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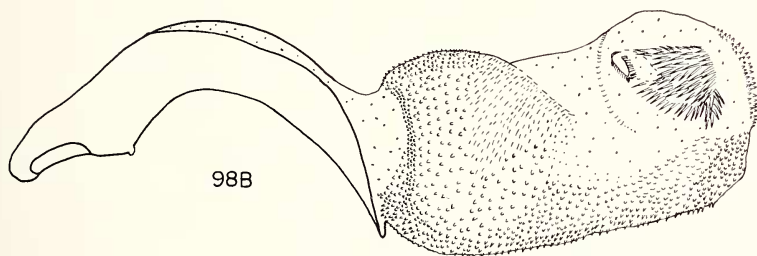
FIGS. 97-98. Male genitalia, IS everted. 97. *L. gibbus* n. sp., left ventro-lateral aspect. 98 A. *L. rectus* (Say), right lateral aspect. 98 B. Same, left lateral aspect. 98 C. Same, dorsal aspect.



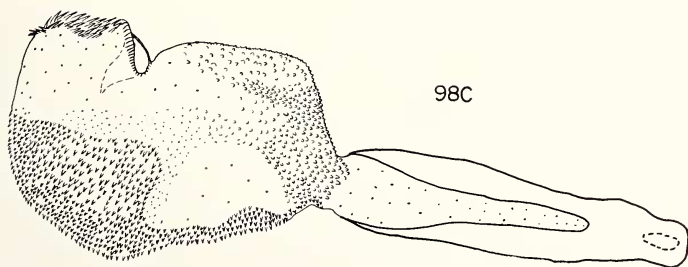
97 L. GIBBUS



98A L. RECTUS



98B

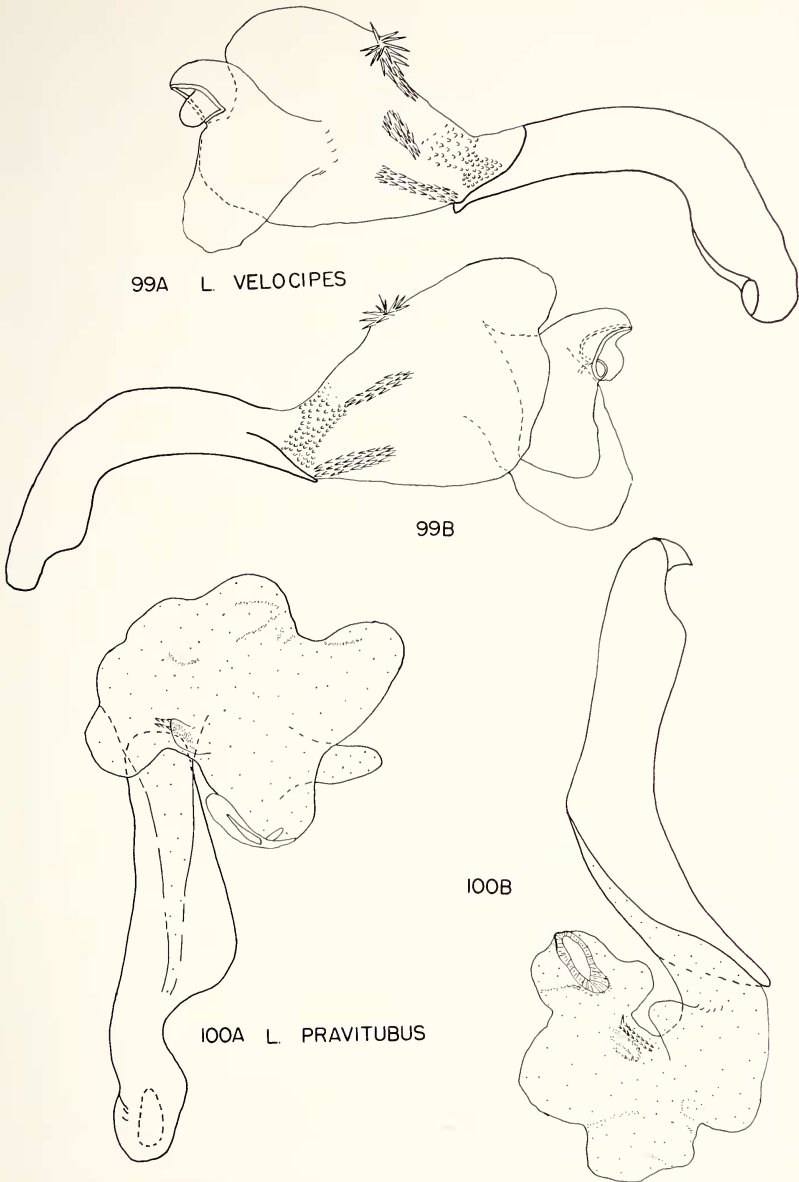


98C

sparsely punctate. Scutellum: apex pointed; microsculpture isodiametric. Prosternum: impunctate; microsculpture absent medially, elongate towards lateral margin. Proepisternum: impunctate; microsculpture usually absent, if present, elongate. Proepimeron: impunctate; microsculpture elongate. Mesosternum: impunctate; microsculpture elongate. Mesepisternum: punctate anteriorly; microsculpture, if present, elongate. Metasternum: impunctate; microsculpture, if present, elongate. Metepisternum: impunctate; microsculpture, if present, elongate. Metepimeron: impunctate; microsculpture absent. *Legs*. Hind coxae: microsculpture on inner surface isodiametric; tarsal segments 1–4 of middle and hind tarsi grooved dorso-laterally. *Elytra*. Microsculpture absent except in striae, trough 3–4 isodiametric units wide; striae 7 not as distinct basally as 1–6; internal plica well-developed; humeri rounded; microsculpture of epipleura absent. *Abdominal sternites*. Microsculpture isodiametric; segment 1 punctate along the basal margin; other segments impunctate. *Aedeagus*. Median lobe: not modified. Internal sac: everts medially, slightly turned dorsally; one large scale group covers much of the surface of the sac, the scales are distinct but vary in length and shape over the surface; a second distinct but smaller group of very elongate, slender scales is located apically near the sclerotized ring; sclerites not present; sclerotized ring present. *Measurements*. (20 specimens). TL—11.2 (10.2–11.8); WH—2.4 (2.1–2.5); WP—3.7 (3.2–4.0); WE—4.5 (4.1–4.9).

DISTRIBUTION. Southeastern United States north to Washington, D. C. and Illinois, and west to Arkansas and West Texas.

LOCALITIES. Alabama. Mobile Co.: Calvert (USNM, CAS); Mt. Vernon (OSU); Mobile (MCZ, TAM). Tuscaloosa Co.: Tuscaloosa (GB). Arkansas. Arkansas Co.: Bayou Meto, Hy. 11, East of Reydel (UA); Ashley Co.: Ouachita River, Hy. 84, 6 mi. W. Crossett (UA); Washington Co.: 5 mi. S. Fayetteville (INHS, MSU); White Co.: Cyprus Bayou, 10 mi. W. Beebe (UA). District of Columbia. Washington (USNM, UMIN, CU, MCZ, INHS, CNC, OSU). Florida. Marion Co. (AM). Illinois. Hardin Co.: Elizabethtown (INHS). Richland and Lawrence Co.'s: Wabash Valley (MCZ). Kentucky. Undetermined locality (CNHM). Louisiana. Calcasieu Co.: 8 mi. W. Vinton, Sabine River Relief (GB); Franklin Co.: Chase (UA); Madison Co.: Tallulah (MCZ); Orleans Co.: New Orleans (MCZ, GB, CAS, USNM, CU, KU); Ouachita Co.: Monroe (USNM). St. Martins Co. (UA); Union Co. (UA); Vernon Co.: Rosepine (UA). Undetermined localities in Louisiana (CAS, CU, INHS, MCZ, OSU, UM, UMIN, USNM). Maryland. Undetermined locality (UMIN). Mississippi. George Co.: Lucedale (CU); Green Co.: Leakville (CU); Harrison Co.: Gulfport (CU); Jackson Co.: Ocean Springs (CU). Missouri. St. Louis Co.: St. Charles



FIGS. 99-100. Male genitalia, IS everted. 99 A. *L. velocipes* Casey, right lateral aspect. 99 B. Same, left lateral aspect. 100 A. *L. pravitubus* n. sp., dorsal aspect. 100 B. Same, right lateral aspect.

(MCZ). North Carolina. Chowan Co.: Edenton (MCZ). South Carolina. Undetermined locality (MCZ). Tennessee. Lake Co.: Grays Ldg. (RTB); Shelby Co.: Memphis (USNM, CAS). Texas. Brazos Co.: College Station (TAM); Calhoun Co.: Alligator Head (USNM); Dallas Co.: Dallas (MCZ, USNM, MSU); Jackson Co.: Edna (USNM); Victoria Co.: Victoria (USNM). *Mitten (MCZ). Undetermined localities in Texas (MCZ, USNM). Virginia. Nelson Co.: Rosslyn (MCZ, USNM). Undetermined locality in Virginia (USNM).

DISCUSSION. This is one of the larger species of *Loxandrus* found in North America. The large size and broadly rounded and explanate posterior angles of the pronotum serve to distinguish this species and *L. pravitubus* from all other *Loxandrus* species. *L. rectus* can be distinguished from *L. pravitubus* by its larger size as well as the characteristic genitalia of both the males and females. It has been collected in all months of the year except September.

17. *Loxandrus pravitubus* New Species

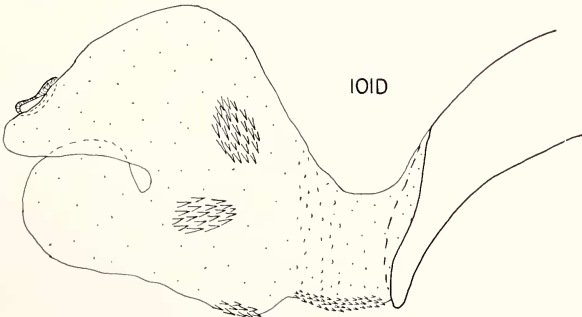
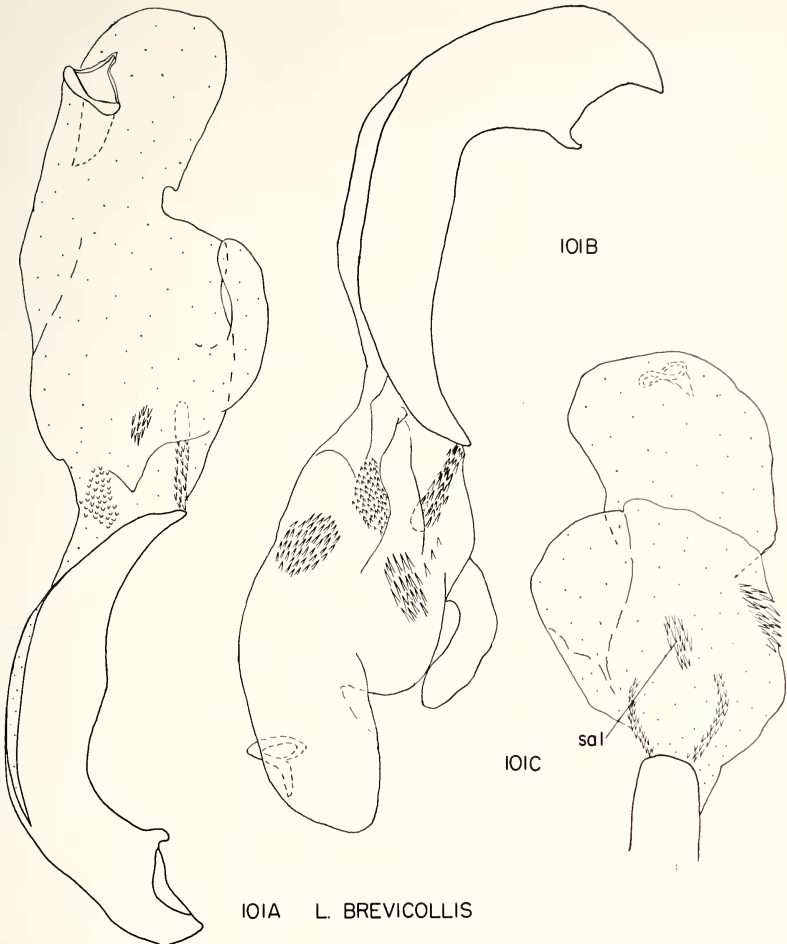
Figs. 44 A, B; 100 A, B; 159

HOLOTYPE. ♂. U.S.A. Texas: Brownsville, June 11–16, 1933. Darlington, Collector. (MCZ). **Paratypes.** 17 ♂♂ 19 ♀♀ (MCZ); 13 ♂♂ 13 ♀♀ (USNM); 1 ♂ 4 ♀♀ (TAM); 1 ♂ (GB); 2 ♂♂ (OSU); 3 ♀♀ (CAS); 1 ♂ 1 ♀ (UA); 3 ♂♂ (CNC); 1 ♂ (CU).

DESCRIPTION. *Color.* Dorsal: black, iridescent. Ventral: usually black, some areas sometimes dark brown, iridescent. Appendages: dark to light brown. *Head.* Clypeus: anterior margin slightly concave. Epistomal and subgenal sutures: distinct, complete. Frontal sulci: shallow, broad, obscure. Microsculpture: clypeus, frons and vertex distinct, isodiametric. Mentum: apex of lobes pointed; tooth distinct, shorter than lobes, rounded at apex; furrows weak; foveae absent; microsculpture elongate lines if present. *Thorax.* Pronotum: microsculpture absent on the disk, isodiametric in the reflexed lateral margins, in the sulci and basal furrows; lateral margins impunctate, evenly rounded their entire length, not sinuate posteriorly; posterior angles rounded; anterior marginal sulcus usually present and complete; posterior marginal sulcus incomplete; median sulcus present, reaching anterior marginal sulcus but not posterior margin; basal impressions distinct, elongate and broad, punctate; area between basal impressions

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FIG. 101. Male genitalia, IS everted. 101 A. *L. brevicollis* (LeC.), left lateral aspect. 101 B. Same, right lateral aspect. 101 C. Same, ventral aspect. 101 D. Same, apex of median lobe, left lateral aspect.



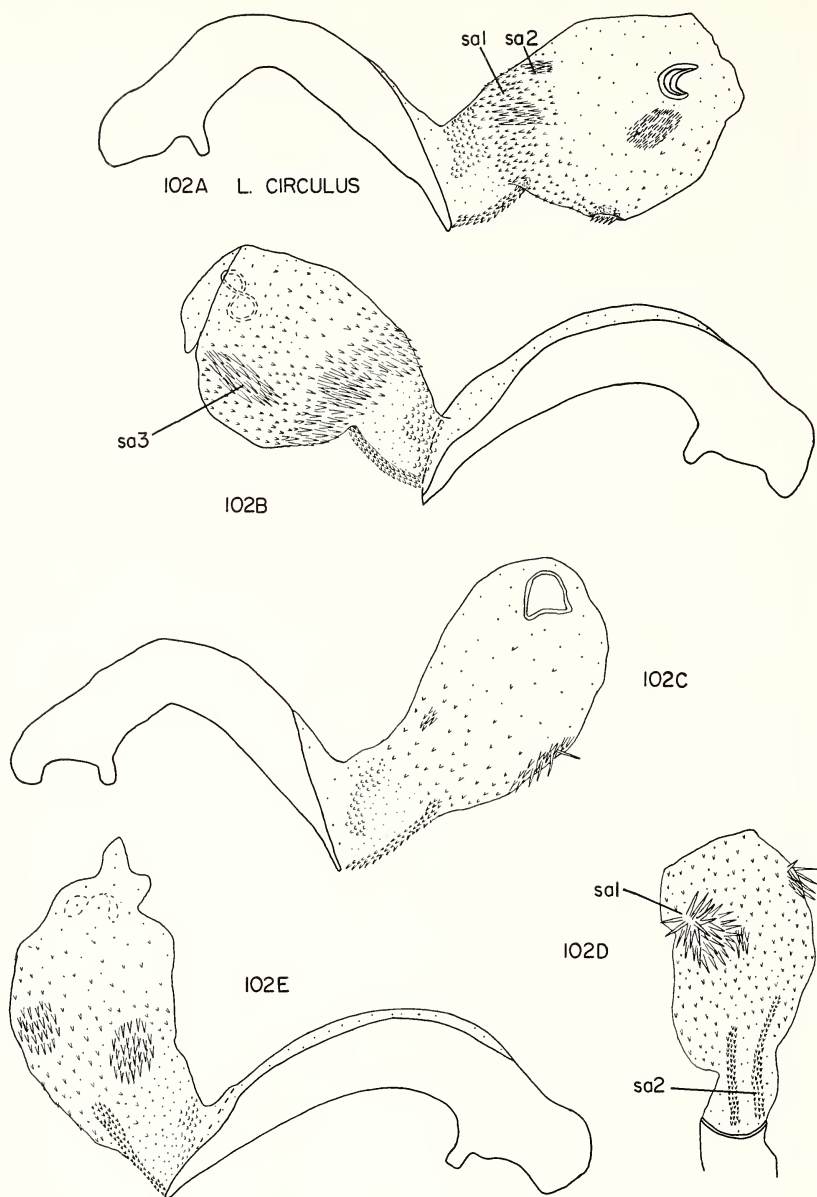


FIG. 102. Male genitalia, IS everted. 102 A. *L. circulus* n. sp., left lateral aspect. 102 B. Same, right lateral aspect. 102 C. Same, left lateral aspect. 102 D. Same, ventral aspect. 102 E. Same, right lateral aspect.

sometimes sparsely punctate. Scutellum: apex pointed; microsculpture variable, if present usually isodiametric or only slightly elongate. Prosternum: impunctate; microsculpture absent medially, elongate towards lateral margin. Proepisternum: sometimes weakly punctate; microsculpture distinctly elongate. Proepimeron: impunctate; microsculpture elongate. Mesosternum: impunctate; microsculpture elongate. Mesepisternum: punctate anteriorly (punctures usually more numerous than in *L. rectus* and covering more of the sclerite). Metasternum: weakly punctate towards lateral margins; microsculpture distinct laterally, elongate and isodiametric. Metepisternum: punctate, shallow but usually distinct; microsculpture distinct, elongate. Metepimeron: impunctate; microsculpture absent. *Legs.* Hind coxae: microsculpture on inner surface isodiametric; tarsal segments 1–4 of hind tarsi and 1–3 of middle tarsi grooved dorso-laterally. *Elytra.* Microsculpture absent except in striae, trough 4–5 isodiametric units wide; striae 7 usually as distinct as 1–6; internal plica well-developed; humeri rounded; microsculpture of epipleura absent. *Abdominal sternites.* Microsculpture isodiametric; segment 1 punctate along the basal margin; other segments impunctate. *Aedeagus.* Median lobe: modified, expanded and turned to the left side in the apical two thirds. Internal sac: everts medially and turns dorsally, several small bulbous projections on the sac; one distinct scale group present; the remainder of surface of the sac covered with very small, weakly sclerotized scales; sclerotized ring present. *Measurements.* (20 specimens). TL—9.3 (8.7–9.3); WH—1.9 (1.8–2.1); WP—3.0 (2.8–3.3); WW—3.7 (3.3–4.1).

DISTRIBUTION. Southeastern United States, west through South Texas to Mexican border.

LOCALITIES. Alabama. Mobile Co.: Calvert (USNM). Mobile (MCZ). Louisiana. Madison Co.: Tallulah (MCZ). North Carolina. Robeson Co.: Lumberton (USNM). Texas. Brazos Co.: College Station (TAM); Cameron Co.: Brownsville (CNC, MCZ, OSU, CAS, USNM); Colorado Co.: Columbus (USNM, MCZ, MSU); Coma Co.: New Brunfels (USNM, MCZ); Dallas Co.: Dallas (MSU, MCZ, USNM); Demmit Co.: Carrizo Springs (USNM); Galveston Co.: Dickinson (TAM); Gillespie Co.: (OSU); Harris Co.: Houston (CAS); Hildago Co.: Weslaco (TAM); Victoria Co.: Victoria (USNM, GB, UM). Wharton Co.: Wharton (CU). *Mitten (MCZ). Unrecorded localities in Texas (MCZ, USNM).

DISCUSSION. This species closely resembles *L. rectus* in most external characters but it is smaller. It has probably been confused with *L. rectus* in most collections. *L. pravitubus* can be distinguished from *L. rectus* by its smaller size and the differences in both the male and

female genitalia. It has been collected in April, May, June, July, October, and December.

THE *L. unilobus*, *L. saccisecundaris*, *L. extendus* AND
L. taeniatus COMPLEX.

DISCUSSION. The four species in this complex cannot be distinguished from each other using external characters. Their determination depends on the examination of characters associated with the male genitalia. *L. saccisecundaris* is known from a single specimen collected from an undetermined locality in Georgia. *L. unilobus* has been collected at Carlisle, Arkansas, at Jacksonville, Florida, and at Lake Chicot State Park in Louisiana. It is also recorded from one or two undetermined localities in Texas. It was collected in June in Florida. *L. taeniatus* is known from eight localities. It has been collected in Alabama, Louisiana, Mississippi and South Carolina in the months of March, April, June and December. *L. extendus* has been collected from an undetermined locality in Arkansas and from two counties in Indiana. The Indiana specimens were collected in January and May.

18. *Loxandrus unilobus* New Species

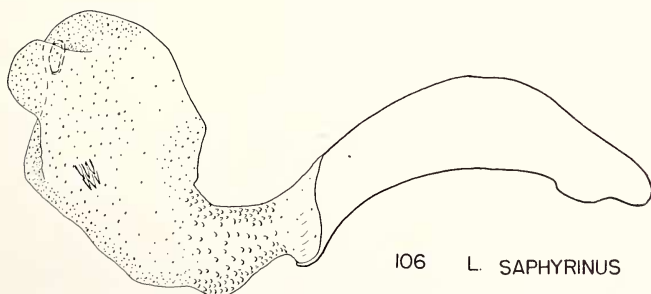
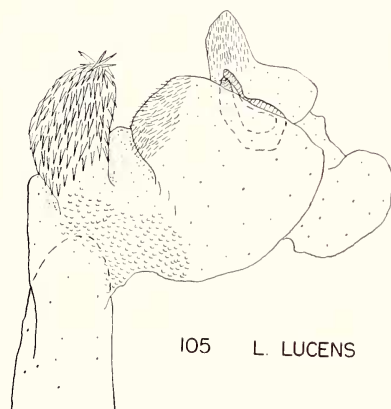
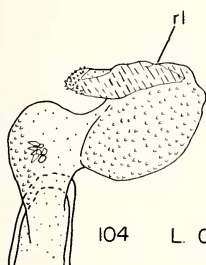
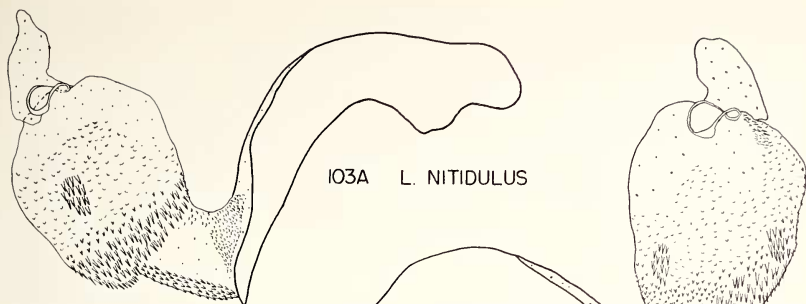
Figs. 59; 123 A, B; 172

HOLOTYPE. ♂. Arkansas. Lonoke Co.: Carlisle (MCZ). Paratypes. 1 ♂ (MCZ); 2 ♂♂ (CU); 1 ♂ (CAS); 1 ♂ (UA); 1 ♂ (TLE).

DESCRIPTION. *Color*. Dorsal: black, shining. Ventral: black to dark brown. Appendages: black to dark brown except palpi which are reddish brown. *Head*. Clypeus: anterior margin straight or slightly concave. Epistomal and subgenal sutures: obscure, complete. Frontal sulci: obscure, shallow, broad. Microsculpture: absent on the anterior part of the clypeus; isodiametric on the frons and vertex. Mentum: apex of lobes narrowly rounded; tooth not as long as lobes; furrows shallow; fovae absent; microsculpture isodiametric. *Thorax*. Pronotum: microsculpture on disk weak, elongate; lateral margins evenly rounded, not sinuate posteriorly; posterior angles rounded; anterior marginal sulcus complete or not; posterior marginal sulcus reaching past basal fovae but incomplete; median sulcus reaching anterior

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FIGS. 103–106. Male genitalia, IS everted. 103 A. *L. nitidulus* (LeC.), right lateral aspect. 103 B. Same, left lateral aspect. 103 C. Same, ventral aspect. 104. *L. crenatus* Chaud., dorsal aspect. 105. *L. lucens* Chaud., dorsal aspect. 106. *L. saphyrinus* (Chaud.), left lateral aspect.



marginal sulcus or not, not reaching posterior margin; basal impressions elongate, moderately deep, punctate or not; area between impressions sparsely punctate or not; area between impressions and lateral margins if punctate only one or two punctures. Scutellum: microsculpture isodiametric; apex pointed. Prosternum: microsculpture elongate, distinct laterally, less so medially; impunctate. Proepisternum: microsculpture isodiametric; impunctate. Proepimeron: microsculpture isodiametric and elongate; impunctate. Mesosternum: microsculpture slightly elongate; impunctate. Mesepisternum: microsculpture isodiametric; impunctate but a few weak, small ridge-like structures anteriorly. Metasternum: microsculpture elongate, more distinct laterally; weakly punctate laterally in some specimens. Metepisternum: microsculpture isodiametric; weakly and sparsely punctate in some specimens. Metepimeron: microsculpture elongate; impunctate. *Legs*. Hind coxae: microsculpture on inner surface elongate. Tarsal segments: 1–3 of middle and hind tarsi and 4 of hind tarsi grooved dorso-laterally. *Elytra*. Microsculpture absent on intervals; all striae distinct, punctate, trough 1 isodiametric unit wide; internal plica well developed; humeri rounded; microsculpture of epipleura absent. *Abdominal sternites*. Microsculpture elongate medially, isodiametric laterally; impunctate; segments 1–3 rugose laterally towards the base; ambulatory setae on segment 2. *Aedeagus*. Median lobe: not modified. Internal sac: everts in a median position, slightly turned to the left side and directed dorsally; six distinct scale groups present; most of the remainder of the sac's surface covered with small weakly sclerotized scales; sclerotized ring present, opening in the left side. *Measurements*. (4 specimens). TL—4.9 (5.5–6.4); WH—1.2 (1.1–1.2); WP—1.8 (1.7–1.9); WW—2.3 (2.2–2.5).

DISTRIBUTION. Central Southern United States.

LOCALITIES. Arkansas. Calhoun Co.: Bayou Moro, Hy. 160 (UA); Lonoke Co.: Carlisle (MCZ). Unrecorded localities in Arkansas (CU). Florida. Duval Co.: Jacksonville (CAS). Louisiana. Evangeline Co.: Lake Chicot State Park (TLE). Texas. Unrecorded localities (MCZ).

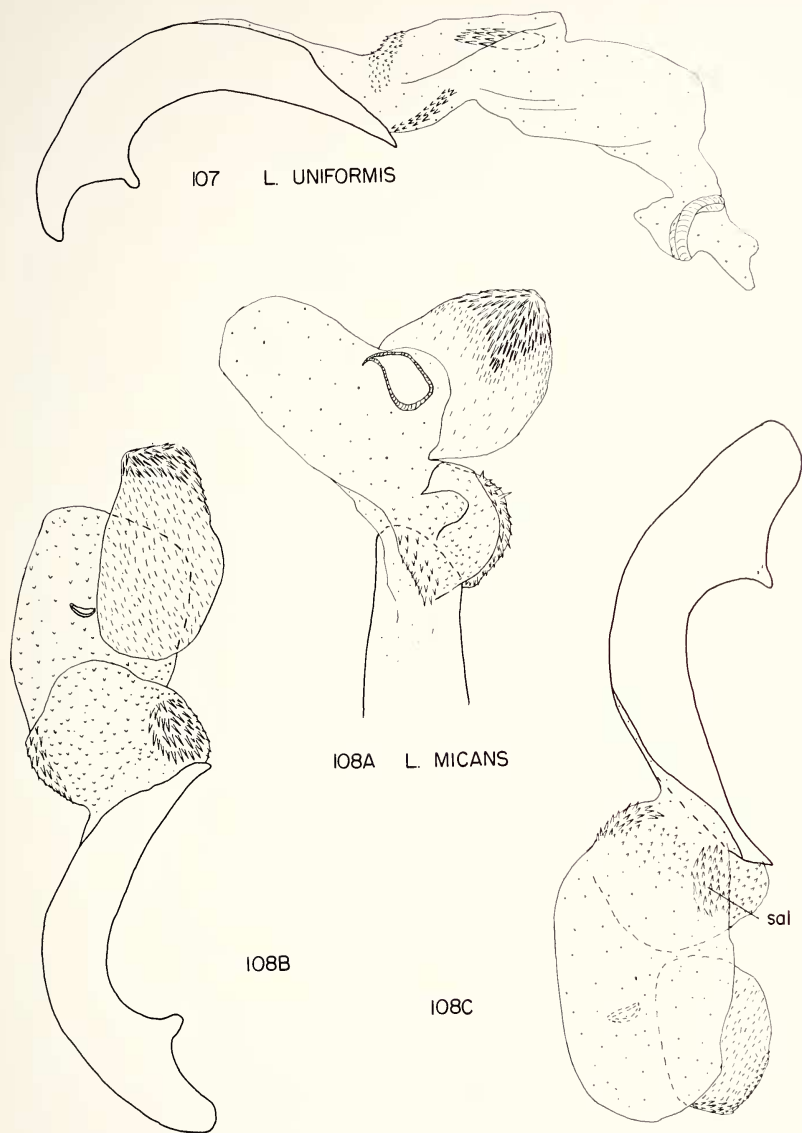
DISCUSSION. See above.

19. *Loxandrus saccisecundaris* New Species

Figs. 54; 121 A, B, C

HOLOTYPE. ♂. Georgia. Frederick Blanchard Collection (MCZ).

DESCRIPTION. *Color*. Dorsal surface: black, shining; ventral surface: black except apex of segment 5 of abdomen which is dark brown.



FIGS. 107-108. Male genitalia, IS everted. 107. *L. uniformis* n. sp., left lateral aspect. 108 A. *L. micans* Chaud., dorsal aspect. 108 B. Same, left lateral aspect. 108 C. Same, right lateral aspect.

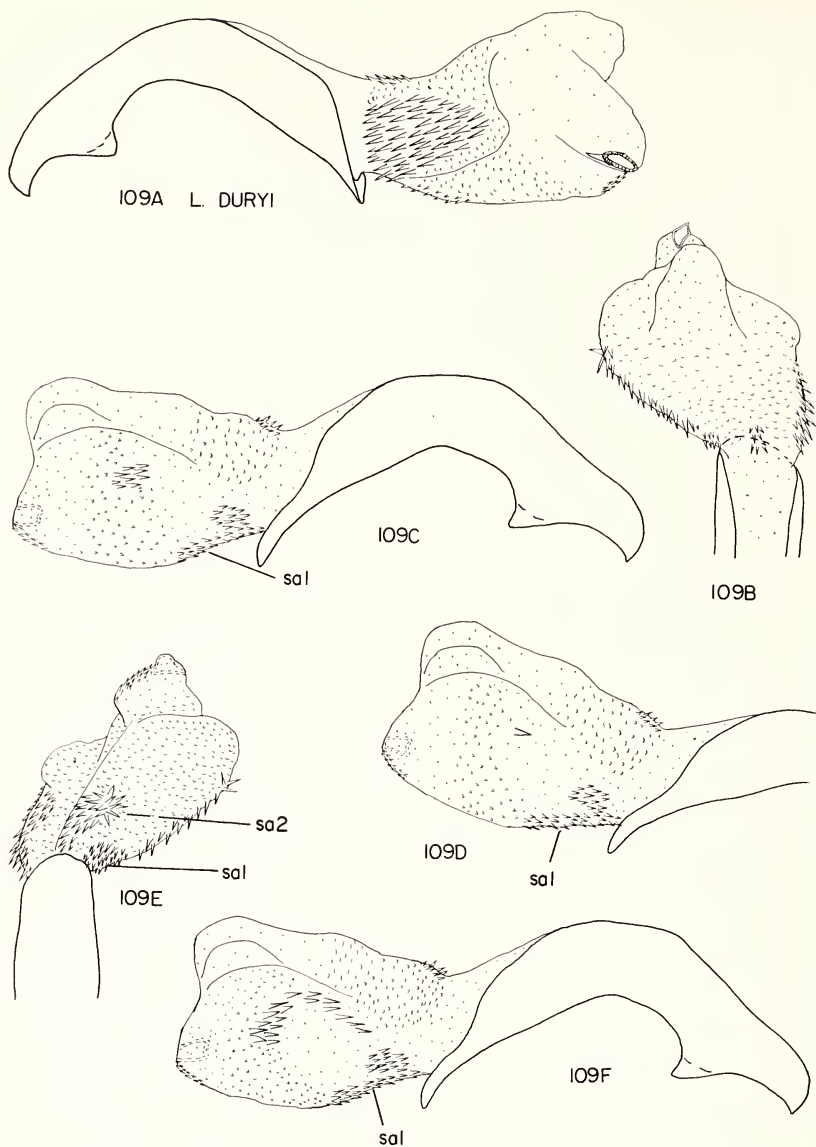


FIG. 109. Male genitalia, IS everted. 109 A. *L. duryi* Wright, left lateral aspect. 109 B. Same, dorsal aspect. 109 C. Same, right lateral aspect. 109 D. Same, apex of median lobe, left lateral aspect. 109 E. Same, apex of median lobe, ventral aspect. 109 F. Same, left lateral aspect.

Appendages: dark to light brown. *Head*. Clypeus: anterior margin slightly concave. Epistomal and subgenal sutures: complete. Frontal sulci: obscure, short, broad, shallow. Microsculpture: clypeus, frons and vertex isodiametric (sometimes weak). Mentum: apex of lobes narrowly rounded; tooth not as long as lobes; furrows and foveae absent; microsculpture slightly elongate. *Thorax*. Pronotum: microsculpture on disk present but weak, elongate, less elongate along lateral margins; lateral margins reflexed and evenly rounded their entire distance, not sinuate posteriorly, impunctate; posterior angles rounded; anterior marginal sulcus complete; posterior marginal sulcus reaching past basal impressions but incomplete; median sulcus just reaching anterior marginal sulcus but not posterior margin; basal impressions moderately deep, elongate, punctate; area between impressions sparsely punctate; area between impressions and lateral margins impunctate. Scutellum: apex pointed; microsculpture isodiametric. Prosteronum: impunctate; microsculpture elongate, more distinct laterally. Proepisternum: impunctate; microsculpture isodiametric. Proepimeron: impunctate; microsculpture isodiametric and slightly elongate. Mesosternum: impunctate; microsculpture slightly elongate. Mesepisternum: weakly punctate in anterior half; microsculpture elongate. Metasternum: punctate towards the lateral margins; microsculpture elongate, more distinct laterally. Metepisternum: weakly punctate; microsculpture elongate. Metepimeron: impunctate; microsculpture elongate, weak. *Legs*. Hind coxae: microsculpture on inner surface elongate; tarsal segments 1-3 of middle and hind tarsi and 4 of hind tarsi grooved dorso-laterally. *Elytra*. Microsculpture absent; all striae distinct, trough 1-2 isodiametric units wide; internal plica well developed; humeri rounded; microsculpture of epipleura absent. *Abdominal sternites*. Microsculpture isodiametric; segment 1 sparsely punctate laterally near the base; segments 1-5 rugose along the basal margin; ambulatory setae present on second abdominal sternite. *Aedeagus*. Median lobe: not modified. Internal sac: everts medially, slightly turned dorsally: 9 distinct scale groups are present; basal quarter of surface covered with small weakly sclerotized scales; sclerotized ring present, opening on the left side; a secondary sac everting near the midline on the left side. *Measurements*. (1 specimen). TL—7.4; WH—1.4; WP—2.4; WW—3.1.

DISTRIBUTION AND LOCALITY. Known from a single specimen from an unidentified locality in Georgia (MCZ).

DISCUSSION. See above.

20. ***Loxandrus extendus*** New Species

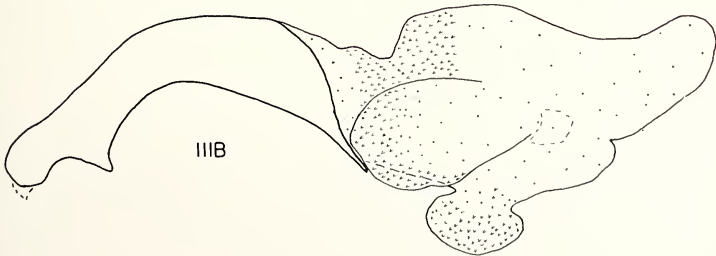
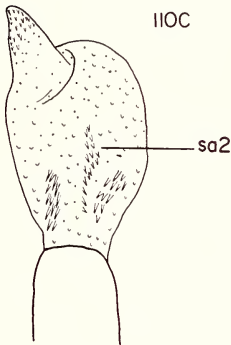
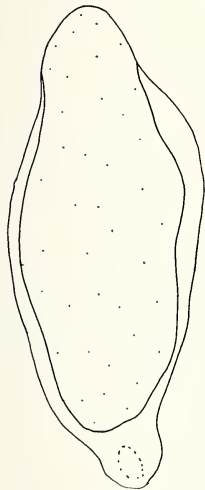
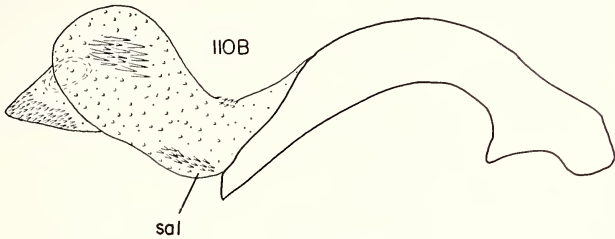
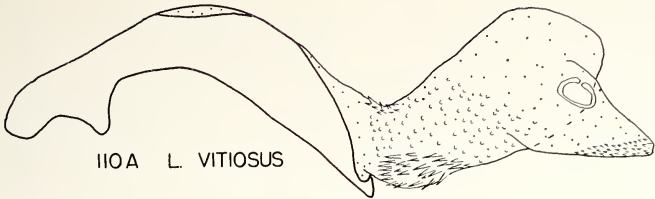
Figs. 62; 131 A, B; 176

HOLOTYPE. ♂. Arkansas, undetermined locality. Strom. Frederick Blanchard Collection (MCZ). Paratypes. 3 ♂♂ (PU).

DESCRIPTION. *Color*. Dorsal: shining black. Ventral: mostly black, some areas dark brown. Appendages: dark brown. *Head*. Clypeus: anterior margin slightly concave. Epistomal and subgenal sutures: weak but complete. Frontal sulci: almost absent, short, broad, shallow. Microsculpture: clypeus, frons and vertex weak, isodiametric. Mentum: apex of lobes narrowly rounded; tooth not as long as lobes, apex rounded; furrows present; fovae obscure; microsculpture isodiametric, sometimes slightly elongate. *Thorax*. Pronotum: microsculpture vaguely present on disk, elongate, isodiametric along lateral margins; lateral margins evenly rounded their entire length, not sinuate posteriorly; posterior angles rounded; anterior marginal sulcus complete; posterior marginal sulcus reaching past basal impressions but incomplete; median sulcus reaching anterior marginal sulcus but not posterior margin; basal impressions moderately deep, elongate; area between basal impressions with only one puncture; area between basal impressions and lateral margins impunctate. Scutellum: apex pointed; microsculpture isodiametric. Prosternum: impunctate; microsculpture isodiametric and elongate laterally becoming very elongate or absent medially. Proepisternum: impunctate; microsculpture isodiametric. Proepimeron: impunctate; microsculpture slightly elongate. Mesosternum: impunctate; microsculpture slightly elongate. Mesepisternum: weakly and sparsely punctate in the anterior half; microsculpture isodiametric to slightly elongate. Metasternum: weakly punctate towards lateral margin; microsculpture isodiametric to weakly elongate, more distinct toward lateral margin. Metepisternum: impunctate; microsculpture slightly elongate. Metepimeron: impunctate; microsculpture elongate. *Legs*. Hind coxae: microsculpture on inner surface elongate; tarsal segments 1–3 of middle and hind tarsi and 4 of hind tarsi grooved dorso-laterally. *Elytra*. Microsculpture absent; all striae distinct, trough 1–2 isodiametric units wide;

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FIGS. 110–111. Male genitalia. 110 A. *L. vitiosus* n. sp., left lateral aspect, IS everted. 110 B. Same, right lateral view, IS everted. 110 C. Same, ventral aspect. 111 A. *L. major* Darl., dorsal aspect. 111 B. Same, left lateral aspect, IS everted.



internal plica well-developed; humeri rounded; microsculpture of epipleura absent. *Abdominal sternites*. Microsculpture distinct, isodiametric laterally, becoming elongate to absent medially; segment 1 sparsely punctate basally and laterally; segments 1–4 sparsely rugose laterally; ambulatory setae present on second abdominal sternite. *Aedeagus*. Median lobe: not modified. Internal sac: everts medially, directed slightly dorsally and turned at the apex towards the left side; 7 scale groups present; sclerotized ring present; a large extension of the main sac at the apex; most of surface of the sac covered with small weakly sclerotized scales. *Measurements*. (1 specimen). TL—7.5; WH—1.4; WP—2.3; WW—3.0.

DISTRIBUTION. Central United States.

LOCALITIES. Arkansas. Unrecorded locality (MCZ). Indiana. Dubois Co. (PU); Virgo Co. (PU).

DISCUSSION. See above.

21. *Loxandrus taeniatus* LeConte

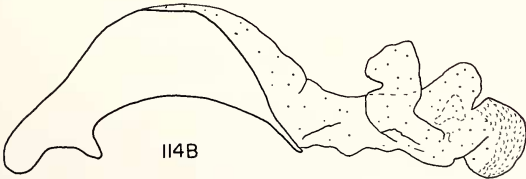
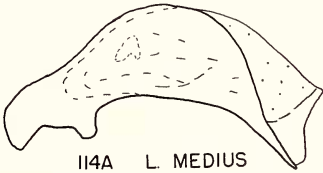
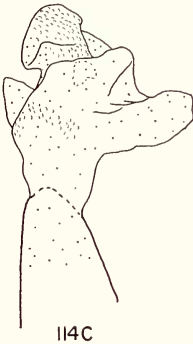
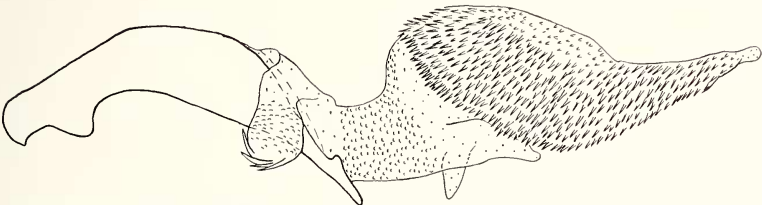
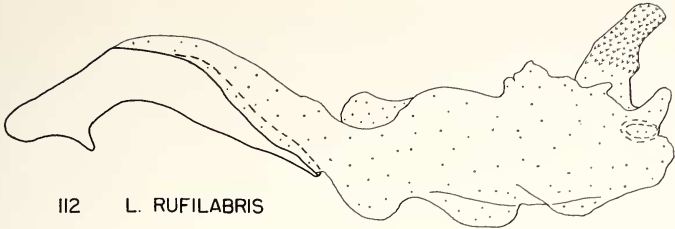
Figs. 60; 127 A, B; 175

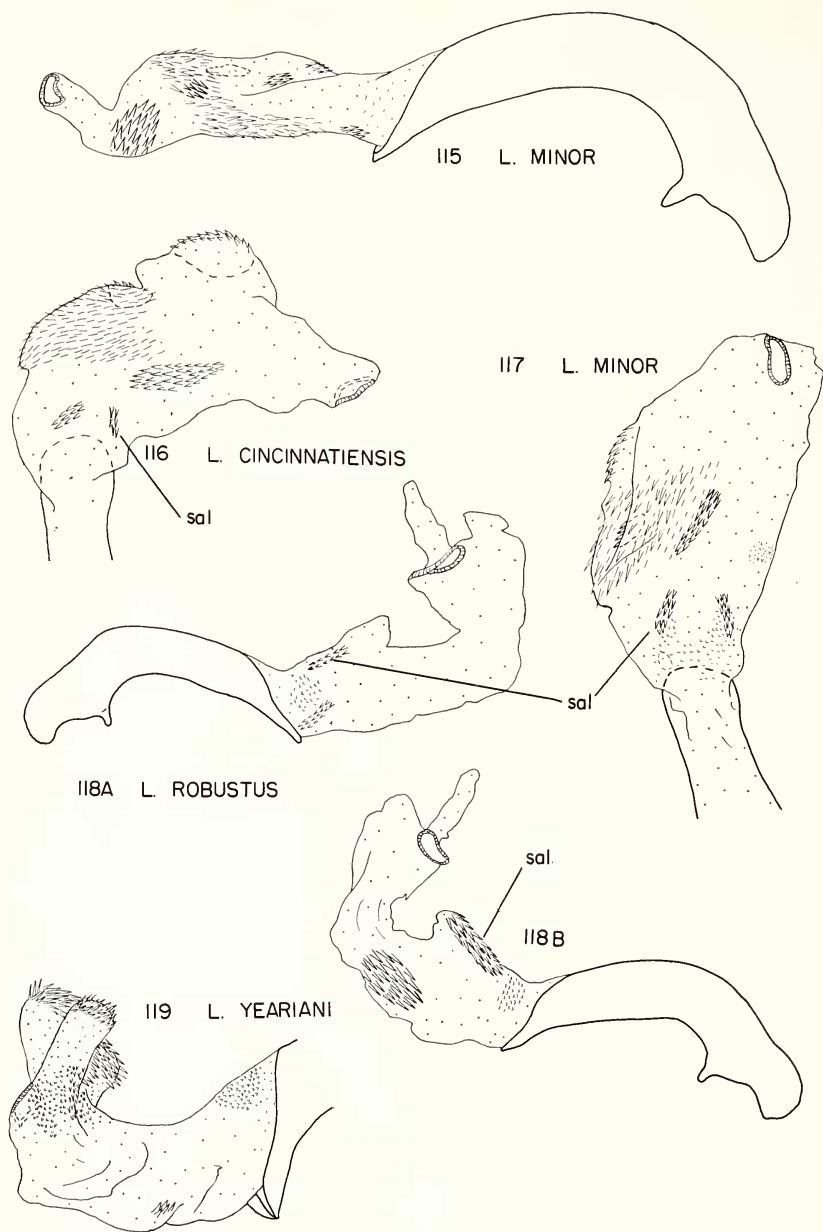
Loxandrus taeniatus LeConte 1852:252. ♂. Marked with a red type label in the MCZ collection. Type No. 5697. No data labels on this specimen but in the original description LeConte states that it is from Louisiana and was presented to him by Mr. Schaum.

DESCRIPTION. *Color*. Dorsal: black, iridescent. Ventral: dark brown to black. Appendages: dark or light to reddish brown. *Head*. Clypeus: anterior margin slightly concave. Epistomal and subgenal sutures: fine but complete. Frontal sulci: feebly present, shallow, broad. Microsculpture: clypeus, frons and vertex, isodiametric. Mentum: apex of lobes broadly rounded; tooth distinct, shorter than lobes, rounded at apex; furrows and foveae absent; microsculpture, isodiametric but slightly elongate. *Thorax*. Pronotum: elongate microsculpture present on disk (distinct in most specimens), isodiametric along lateral margins; lateral margin evenly rounded, not sinuate posteriorly, impunctate except (sometimes) near basal angles; posterior angles rounded; anterior marginal sulcus complete; posterior marginal sulcus

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FIGS. 112–114. Male genitalia. 112. *L. rufilabris* Cast., left lateral aspect, IS everted. 113 A. *L. australiensis* Sloane, left lateral aspect, IS everted. 113 B. Same, dorsal aspect, IS everted. 114 A. *L. medius* Darl., left lateral aspect. 114 B. Same, left lateral aspect, IS everted. 114 C. Same, dorsal aspect, sac everted.





FIGS. 115-119. Male genitalia, IS everted. 115. *L. minor* Chaud., right lateral aspect. 116. *L. cincinnatiensis* Casey, dorsal aspect, apex of median lobe. 117. *L. minor* Chaud., dorsal aspect, apex of median

reaching past the basal foveae but incomplete; median sulcus reaching anterior marginal sulcus but not posterior margin; basal impressions elongate, moderately deep, punctate or not; area between basal impressions sparsely punctate; area between basal impressions and lateral margins usually impunctate. Scutellum: apex pointed; microsculpture isodiametric. Prosternum: impunctate; microsculpture where present, elongate. Proepisternum: impunctate; microsculpture isodiametric. Proepimeron: impunctate; microsculpture isodiametric and/or slightly elongate. Mesosternum: impunctate; microsculpture elongate. Mesepisternum: impunctate; microsculpture elongate. Mesepisternum: weakly punctate in groove only; microsculpture elongate. Metasternum: sometimes sparsely and weakly punctate laterally; microsculpture more distinct laterally and anteriorly, elongate. Metepisternum: punctate (sometimes sparse and weak); microsculpture isodiametric. Metepimeron: impunctate; microsculpture absent. *Legs*. Hind coxae: microsculpture on inner surface obscure, elongate; tarsal segments 1–3 of middle and hind tarsi grooved dorso-laterally. *Elytra*. Microsculpture absent; all striae distinct, trough 1–2 isodiametric units wide; internal plica well developed; humeri rounded; microsculpture of epipleura absent. *Abdominal sternites*. Microsculpture isodiametric laterally, elongate medially; impunctate; rugose on lateral-basal areas of segments 1–3. *Aedeagus*. Median lobe: not modified. Internal sac: everts medially; 5 distinct scale groups; most of the apical quarter of the sac covered by moderately large scales but not forming a distinct group; remainder of the surface covered with small weakly sclerotized scales; one area on the right side distinctly free of scales; sclerotized ring present. *Measurements*. (16 specimens). TL—6.7 (6.2–7.5); WH—1.3 (1.2–1.4); WW—2.7 (2.5–2.8).

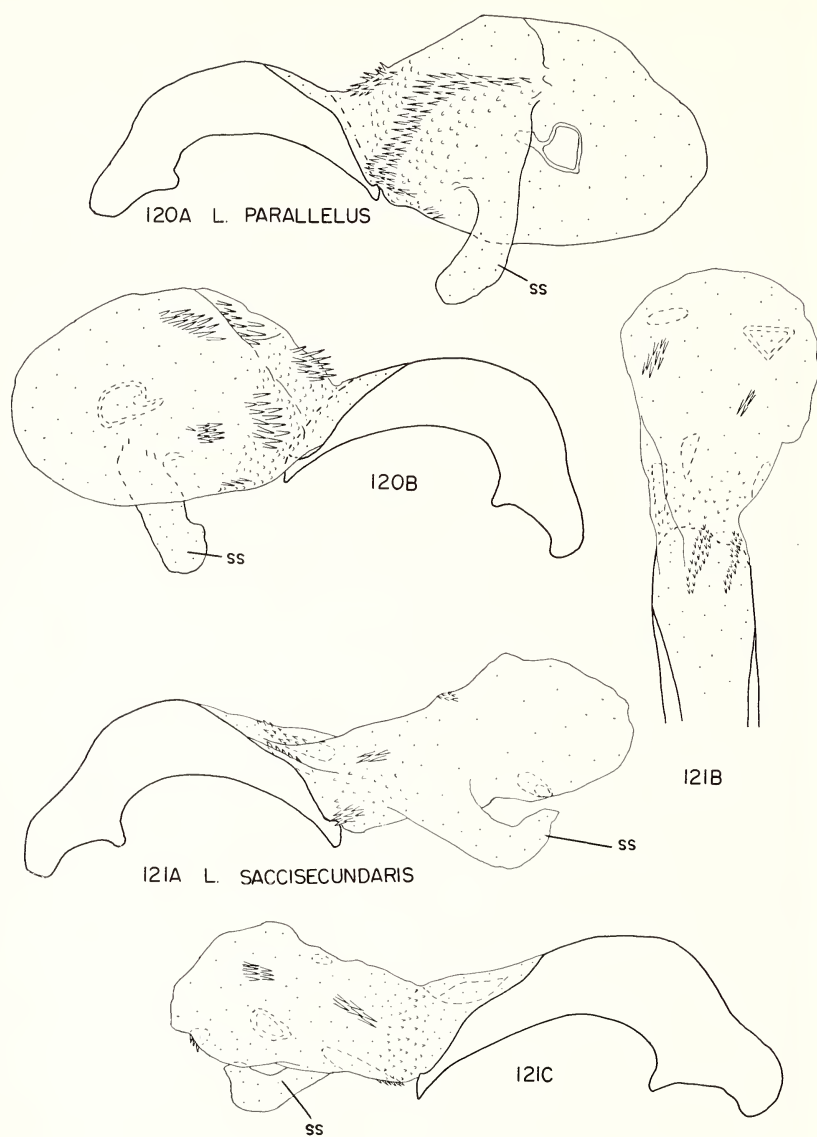
DISTRIBUTION. Southern United States.

LOCALITIES. Alabama. Mobile Co.: Calvert (CAS). Arkansas. Arkansas Co.: E. of Reydel, Hy. 11, Bayou Meto (UA). Georgia. Unrecorded localities (MCZ, UM, INHS). Louisiana. Beauregard Co.: Rosepine (UA); Evangeline Co.: Lake Chicot State Park (TLE); Iberia Co.: New Iberia (USNM); St. Martin Co. (UA). Mississippi. Hancock Co. (USNM). North Carolina. *Broadman (?). South Carolina. Sumpter Co.: Sumpter (GB).

DISCUSSION. See above.

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lobe. 118 A. *L. robustus* n. sp., left lateral aspect. 118 B. Same, right lateral aspect. 119. *L. yeariani* n. sp., right lateral aspect, apex of median lobe.



FIGS. 120–121. Male genitalia, IS everted. 120 A. *L. parallelus* Casey, left lateral aspect. 120 B. Same, right lateral aspect. 121 A. *L. saccisecundaris* n. sp., left lateral aspect. 121 B. Same, dorsal aspect. 121 C. Same, right lateral aspect.

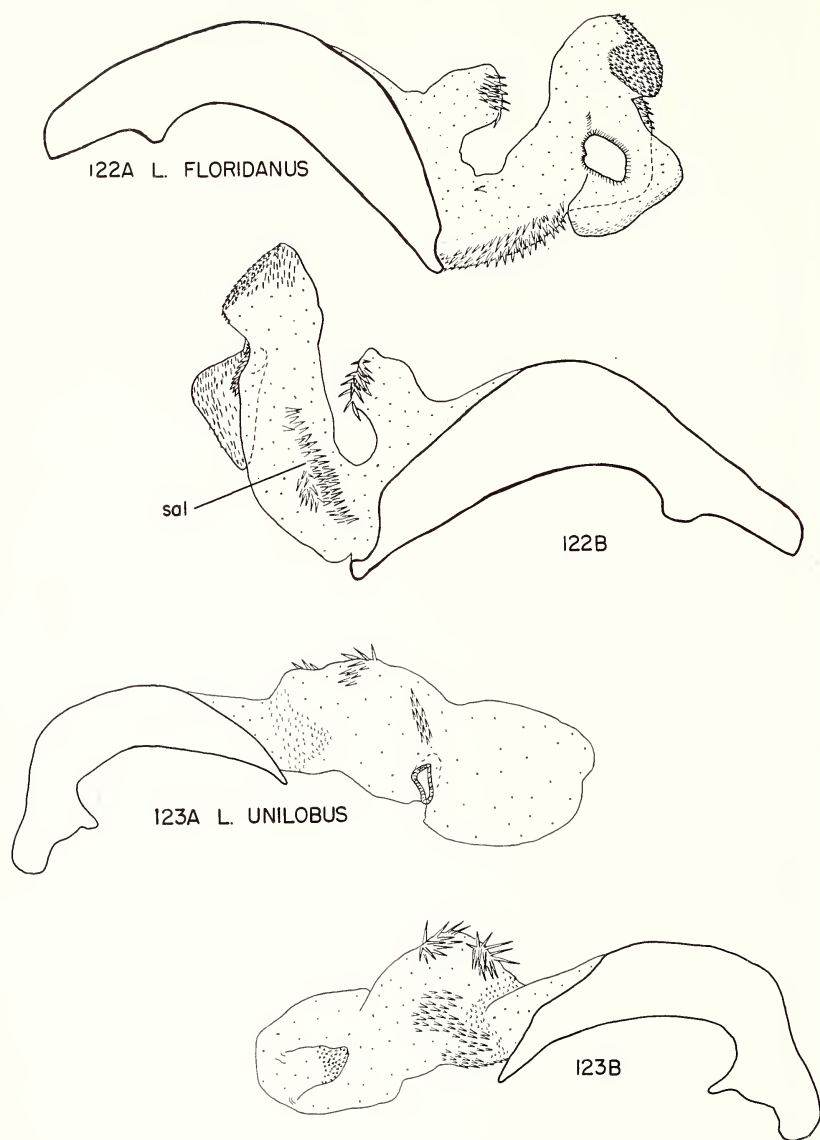
22. ***Loxandrus floridanus* LeConte**

Figs. 17; 58; 122 A, B; 171

Loxandrus floridanus LeConte, 1878:376. ♀. Florida, Capron; 24-4; Type No. 5694 (MCZ). There are 7 additional specimens in the series, 3 males and 4 females. See discussion.

Loxandrus scitus Casey, 1918:388. ♂. Florida, Dunedin. Type No. 47351 (USNM). One ♂ paratype.

DESCRIPTION. *Color*. Dorsal: black, shining. Ventral: usually black, sometimes dark brown. Appendages: femur and tibia usually black, sometimes dark brown; tarsi, palpi and antennae dark to reddish brown. *Head*. Clypeus: anterior margin slightly concave. Epistomal and subgenal sutures: distinct, complete. Frontal sulci: obscure, shallow, broad. Microsculpture: clypeus, frons and vertex isodiametric. Mentum: apex of lobes narrowly rounded; tooth not as long as lobes; furrows shallow; foveae absent; microsculpture isodiametric or slightly elongate. *Thorax*. Pronotum: microsculpture on disk elongate, distinct; lateral margins evenly rounded their entire distance, not sinuate or oblique posteriorly; posterior angles rounded; anterior marginal sulcus complete; posterior marginal sulcus reaching past basal impressions but incomplete; median sulcus reaching anterior marginal sulcus but not posterior margin; basal impressions elongate, shallow, punctate; area between basal impressions punctate; area between basal impressions and lateral margins punctate or not, when punctate sparsely so. Scutellum: microsculpture isodiametric; apex pointed. N. B. Entire ventral surface impunctate. Prosternum: microsculpture elongate, more distinct laterally. Proepisternum: microsculpture isodiametric. Proepimeron: microsculpture isodiametric and elongate. Mesosternum: microsculpture slightly elongate. Mesepisternum: microsculpture isodiametric. Metasternum: microsculpture elongate medially, isodiametric laterally. Metepisternum: microsculpture isodiametric. Metepimeron: microsculpture elongate, weak. *Legs*. Hind coxae: microsculpture on inner surface isodiametric. Tarsi: segments 1-3 of middle and hind tarsi and 4 of hind tarsi grooved dorso-laterally. *Elytra*. Microsculpture on intervals absent; all striae except basal portion of 7 distinct, trough 2-3 sometimes 4 isodiametric units wide; internal plica well developed; humeri rounded; microsculpture of epipleura absent. *Abdominal sternites*. Microsculpture elongate medially, isodiametric laterally; segment 1 weakly punctate basally or not, other segments impunctate; segments 1-4 weakly rugose laterally toward the base; ambulatory setae present on segment 2. *Aedeagus*. Median lobe: not modified. Internal sac: everts medially and is directed dorsally; seven more or less distinct



FIGS. 122-123. Male genitalia, IS everted. 122 A. *L. floridanus* LeC., left lateral aspect. 122 B. Same, right lateral aspect. 123 A. *L. unilobus* n. sp., left lateral aspect. 123 B. Same, right lateral aspect.

scale groups including those on the two secondary sacs present; two secondary sacs, one at the base on the dorsal surface and one toward the apex on the left lateral surface; sclerotized ring present, partially on the main sac and on the apical secondary sac. *Measurements*. (20 specimens). TL—8.0 (7.3–9.4); WH—1.6 (1.5–1.9); WP—2.5 (2.3–2.8); WW—3.2 (2.9–3.7).

DISTRIBUTION. Southern and Southeastern United States and West Indies.

LOCALITIES. UNITED STATES. Alabama. Mobile Co.: Delchamps (OSU, MCZ, USNM, CAS, GB); unrecorded locality (CU). Florida. Alachua Co.: Gainesville (CU); Charlotte Co.: Punta Gorda (CAS); Collier Co.: Everglade (USNM); Dade Co.: Biscayne (USNM), Biscayne Bay (AM), Hialeah (TLE), Homestead (MCZ); Duval Co.: Jacksonville (CAS, OSU); Hillsborough Co.: Tampa (MCZ); Lucie Co.: Capron (old Fort on 1861 map) (USNM); Manatee Co.: Oneco (GB); Osceola Co.: Kissimmee (AM); Palm Co.: Lake Worth (AM); Pinellas Co.: Dunedin (PU); Sarasota Co.: Myakka River State Park (GB). *Indian River (USNM). Unrecorded locality in Florida (MCZ). Louisiana. Calcasieu Co.: Sabine River Ferry (CU); Madison Co.: Tallulah (MCZ); Orleans Co.: New Orleans (MCZ, USNM, CAS); Plaquemines Co.: Myrtle Grove (INHS). Mississippi. Hancock Co.: Waveland (USNM); Jackson Co.: Ocean Springs (CU), Horn Island (CU). *Gulf View (USNM). Texas. Comal Co.: New Braunfels (CAS); Orange Co. (TAM). Unrecorded locality in Texas (MCZ). **WEST INDIES.** South Bimini Island (AM).

DISCUSSION. This species was described by LeConte (1878) from Capron and Enterprise, Florida. The material in the LeConte collection (MCZ) consists of the female type and seven additional specimens. The last specimen in the series is a female from Louisiana and was probably not part of the original type material. The three males in the series are all the same species. For this reason I am considering this a valid species.

The males and females appear to be distinct and can be identified by the characters given in the key. Too much reliance should not be placed on external characters in the females, however, and exact determinations should be based on examination of the male aedeagus. Specimens have been collected in February, March, April, May, June, July, October, November and December.

23. *Loxandrus agilis* (Dejean 1828)

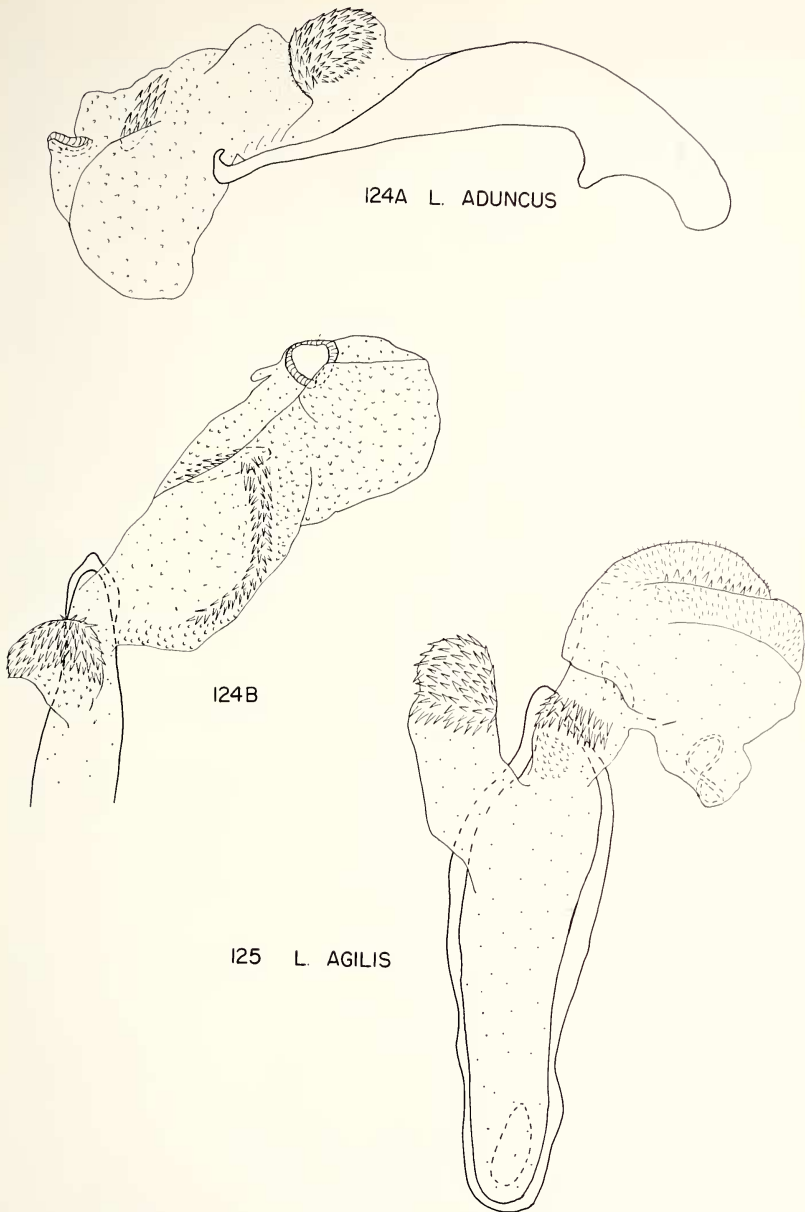
Figs. 13; 20 A, B, C; 21; 56; 125; 173

Feronia agilis Dejean 1828:244. *Lectotype* (here selected) . ♂. The first in a series of 5 specimens in the Chaudoir Collection. It is the only one

marked with a green Dejean determination label and is recorded from Boreal America (PMNH).

Loxandrus flavilimbus Blatchley, 1918:418. *Type*. ♂. Collected north of Dunedin, Florida, under a board near the border of a pond on January 1 (PU).

DESCRIPTION. *Color.* Dorsal: black, shining. Ventral: black to dark brown. Appendages: dark to reddish brown. *Head.* Clypeus: anterior margin straight. Epistomal and subgenal sutures: distinct, complete. Frontal sulci: obscure, broad, shallow. Microsculpture: clypeus, frons and vertex distinct, isodiametric. Mentum: apex of lobes rounded; tooth distinct, not as long as lobes; furrows shallow; fovae, if present, shallow, obscure; microsculpture isodiametric. *Thorax.* Pronotum: microsculpture distinct, usually isodiametric, sometimes slightly elongate; lateral margins evenly rounded, not sinuate posteriorly; posterior angles rounded; anterior marginal sulcus complete; posterior marginal sulcus reaching past basal impressions but incomplete; median sulcus reaching anterior marginal sulcus but not posterior margin; basal impressions shallow, elongate, punctate or not; area between basal impressions punctate; area between impressions and lateral margins punctate or not. Scutellum: apex pointed; microsculpture isodiametric. Prosteronum: impunctate; microsculpture elongate medially, isodiametric laterally. Proepisternum: impunctate, microsculpture distinct, isodiametric. Proepimeron: impunctate; microsculpture isodiametric and elongate. Mesosternum: impunctate; microsculpture feebly elongate. Mesepisternum: impunctate; microsculpture isodiametric. Metasternum: impunctate; microsculpture elongate medially, isodiametric laterally. Metepisternum: impunctate; microsculpture isodiametric. Metepimeron: impunctate; microsculpture distinct, isodiametric or feebly elongate. *Legs.* Hind coxae: microsculpture on inner surface isodiametric. Tarsi: segments 1-4 of hind tarsi and 1-3 of middle tarsi grooved dorso-laterally. *Elytra.* Microsculpture sometimes weakly present on the intervals, if so then it is very elongate; all striae distinct, trough 1 sometimes 2 isodiametric units wide; lateral margin distinctly sinuate apically; internal plica distinct; humeri rounded; microsculpture of epipleura usually present, elongate. *Abdominal sternites.* Microsculpture distinct, elongate medially, isodiametric laterally; impunctate; segments 1-3 rugose on the lateral and basal surfaces; ambulatory setae sometimes present on segment 2. *Aedeagus.* Median lobe: compressed dorso-ventrally; right lateral margin strongly sinuate apically; apex turned toward the right side, pointed. Internal sac: four distinct scale groups present; entire right side and most of the ventral surface of the sac covered with



FIGS. 124–125. Male genitalia, IS everted. 124 A. *L. aduncus* n. sp., right lateral aspect. 124 B. Same, dorsal aspect. 125. *L. agilis* (Dej.), dorsal aspect.

elongate scales that do not form a well defined group; remainder of the surface covered with small, weakly sclerotized scales; secondary sac everts from the dorsal surface of the membranous portion of the main lobe, scale group at its apex; sclerotized ring present. *Measurements*. TL—9.1 (8.0–9.8); WH—1.8 (1.6–1.8); WP—2.9 (2.5–3.1); WW—3.6 (3.2–3.8).

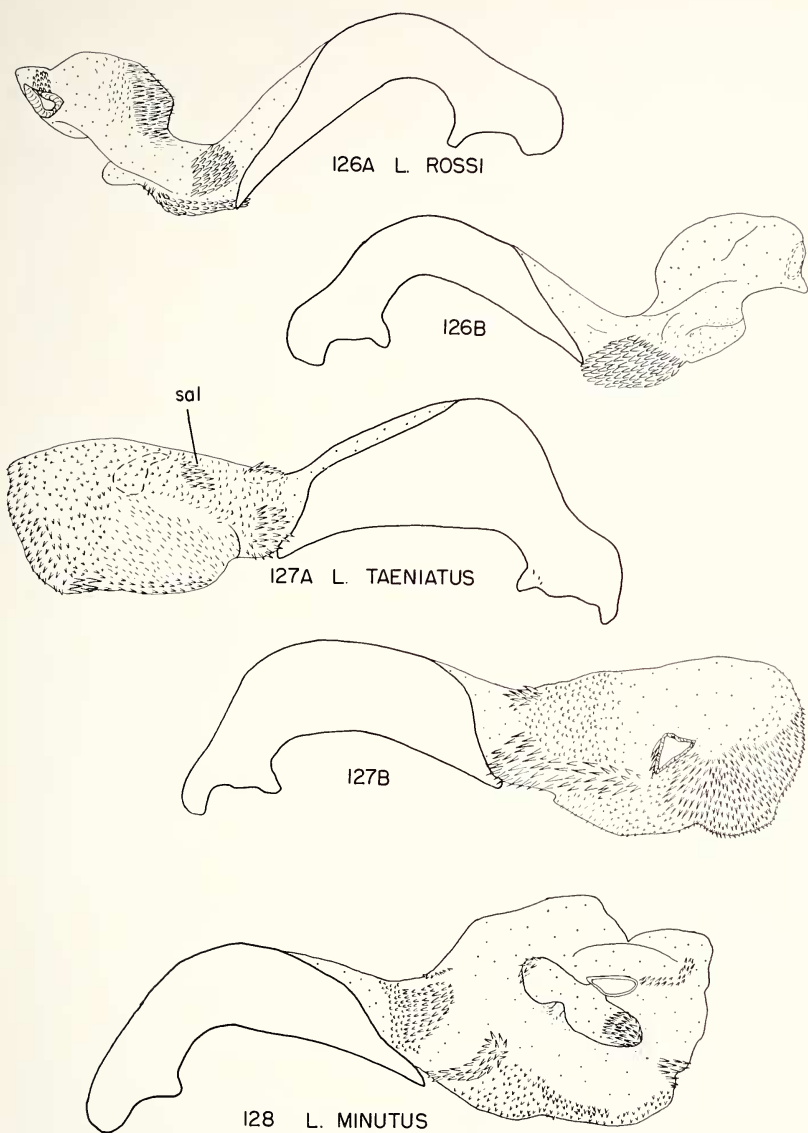
DISTRIBUTION. Southeastern United States west to Texas.

LOCALITIES. Florida. Alachua Co. (FSPB); Charlotte Co.: Punta Gorda (CAS); Desoto Co.: Arcadia (GB); Duval Co.: Mayport (FSPB), Jacksonville (CAS, OSU); Highlands Co.: Archbold Biological Station (CU, PSU), Brighton (MCZ), Highlands Hammock (TLE); Hillsborough Co.: Tampa (MSU, USNM, CU); Manatee Co.: Oneco (PU, GB); Orange Co.: Winter Park (MCZ), Titusville (CNC); Pinellas Co.: Dunedin (PU); Putnam Co.; Crescent City (USNM); Volusia Co.: Enterprise (MSU), Sanford (MCZ), Lake Helen (CAS). *Indian River (USNM). Unrecorded locality in Florida (CAS). Texas. *Mitten (MCZ).

DISCUSSION. The males and females of this species can be identified using external characters. The male aedeagus should be examined, however, when possible. This species has been collected in the months of February, March, April, May, June, August, and December.

THE *L. aduncus*, *L. cervicalis*, *L. parallelus*, *L. taeniatus* AND
L. spinilunatus COMPLEX

DISCUSSION. These five species closely resemble each other in all external characters. They cannot be separated from one another except on the basis of characters associated with the male aedeagii. *L. parallelus*, described by Casey from Monroe, Louisiana, appears to have a more western distribution than the other four species under discussion. It has been collected in the months of April, June, July and August. *L. cervicalis* is known from several localities in Florida and one locality in Arkansas. It has been collected in January, March, August and October. *L. aduncus* is presently known from four localities in the Southeastern United States. Collecting data indicate this species being collected in January, February, May and June. The external characters of *L. taeniatus* are somewhat variable and the species is keyed out in several different places in the key. It is apparently a southern form although not reaching into Florida, and has been collected in the months of March, April, June and December. *L. spinilunatus* is known from only two male specimens from undetermined localities in Arkansas and Louisiana. There were no collecting data with the specimens indicating at what time of year they were taken.



FIGS. 126-128. Male genitalia, IS everted. 126 A. *L. rossi* n. sp., right lateral surface. 126 B. Same, left lateral surface. 127 A. *L. taeniatus* LeC., right lateral aspect. 127 B. Same, left lateral aspect. 128. *L. minutus* n. sp., left lateral aspect.

24. **Loxandrus aduncus** New Species

Figs. 57; 124 A, B; 174

HOLOTYPE. ♂. Florida. Winter Park; John George Gehring Collection (MCZ). Paratypes. 2 ♂♂ (MCZ); 1 ♂ (TLE); 3 ♂♂ (CU).

DESCRIPTION. *Color*. Dorsal: black, shining. Ventral: black to dark brown. Appendages: dark to reddish brown. *Head*. Clypeus: anterior margin slightly concave. Epistomal and subgenal suture: distinct, complete. Frontal sulci: obscure, short, broad, shallow. Microsculpture: clypeus, frons and vertex distinct, isodiametric. Mentum: apex of lobes narrowly rounded; tooth distinct, slightly shorter than lobes; furrows shallow; fovae absent; microsculpture isodiametric. *Thorax*. Pronotum: microsculpture distinct, usually isodiametric but sometimes weakly elongate; lateral margins sparsely punctate in posterior quarter or less, evenly rounded their entire length, not sinuate; posterior angles broadly rounded; anterior marginal sulcus complete; posterior marginal sulcus reaching past basal impressions but incomplete; median sulcus reaching anterior marginal sulcus but not posterior margin; basal impressions moderately deep, elongate, punctate; area between basal impressions punctate; area between basal impressions and lateral margin sparsely punctate, most punctures confined to the posterior margin. Scutellum: apex pointed; microsculpture isodiametric. Prosternum: microsculpture elongate; impunctate. Proepisternum and Proepimeron: microsculpture isodiametric; impunctate. Mesosternum: microsculpture elongate; impunctate. Mesepisternum: microsculpture isodiametric; impunctate. Metasternum: microsculpture elongate medially, isodiametric laterally; impunctate. Metepisternum: microsculpture isodiametric; impunctate. Metepimeron: microsculpture elongate; impunctate. *Legs*. Hind coxae: microsculpture on inner surface elongate. Tarsi: segments 1–3 of middle and hind tarsi and 4 of hind tarsi grooved dorso-laterally. *Elytra*. Microsculpture absent; all striae distinct, trough 1–2 isodiametric units wide; internal plica well developed; humeri rounded; microsculpture of epipleura absent. *Abdominal sternites*. Microsculpture distinct, elongate medially, isodiametric laterally; impunctate; base of segments 1–3 rugose, ambulatory setae sometimes present on second abdominal sternite. *Aedeagus*. Median lobe: apex forming a hook that is turned dorsally. Internal sac: three distinct scale groups are present on the main body of the sac; most of the remainder of the sac's surface is covered with small weakly sclerotized scales; a secondary sac everts on the dorsal membranous portion of the median lobe, the apex is covered with a scale group; sclerotized

ring present. *Measurements*. (7 ♂ specimens). TL—8.2 (7.8–8.4); WH—1.8 (1.7–1.8); WP—2.4 (2.2–2.6); WW—3.2 (3.0–3.3).

DISTRIBUTION. Extreme Southeastern United States.

LOCALITIES. Alabama. Mobile Co.: Mobile (MCZ). Florida. Highlands Co.: Archbold Bio. Sta. (CU), Highlands Hammock (TLE); Orange Co.: Winter Park (MCZ).

DISCUSSION. See above.

25. *Loxandrus parallelus* Casey

Figs. 4; 55; 120 A, B; 170

Loxandrus parallelus Casey 1918:386. Holotype. ♂. Type No. 47342. USNM. Casey states in the original description that he collected "a single example" at Monroe, Louisiana.

DESCRIPTION. *Color*. Dorsal: black, shining; elytra iridescent. Ventral: dark brown to black, shining. Appendages: dark to light brown or straw yellow. *Head*. Clypeus: anterior margin slightly concave. Epistomal and subgenal sutures distinct, complete. Frontal sulci: obscure, short, shallow, broad. Microsculpture: clypeus, frons, and vertex isodiametric. Mentum: apex of lobes rounded; tooth distinct, shorter than lobes; furrows shallow; foveae absent; microsculpture slightly elongate. *Thorax*. Pronotum: microsculpture distinct, elongate; lateral margins evenly rounded their entire length, not sinuate posteriorly; posterior angles rounded; anterior marginal sulcus complete; posterior marginal sulcus reaching past basal impressions but not complete; median sulcus reaching anterior marginal sulcus but not posterior margin; basal impressions moderately deep, elongate, punctate; area between impressions punctate; area between impressions and lateral margins punctate or not. Scutellum: apex pointed; microsculpture isodiametric. Prosternum: microsculpture elongate, becoming more distinct laterally; impunctate. Proepisternum, proepimeron, mesosternum and mesepimeron: microsculpture isodiametric; impunctate. Metasternum: microsculpture elongate laterally and around middle coxae, isodiametric in anterior median portion; impunctate. Metepisternum: microsculpture isodiametric; impunctate. Metepimeron: microsculpture absent; impunctate. *Legs*. Hind coxae: microsculpture on inner surface distinct, elongate. Tarsal segments: 1–3 of middle and hind tarsi and 4 of hind tarsi grooved dorso-laterally. *Elytra*. Microsculpture absent; all striae distinct, trough 1–2 isodiametric units wide; internal plica well developed; humeri rounded; microsculpture of epipleura absent. *Abdominal sternites*. Microsculpture elongate medially, isodiametric laterally; impunctate; segments 1–3 rugose at the base and 1–4 rugose laterally. *Aedeagus*. Median

lobe: not modified. Internal sac: everts in a median position and deflected downward; six distinct scale groups present; remainder of the surface of the primary sac is covered with very small, lightly sclerotized scales; a secondary sac everts on the left side; sclerotized ring present. *Measurements*. (20 specimens). TL—6.9 (6.5–7.4); WH—1.3 (1.2–1.4); WP—2.1 (1.9–2.3); WW—2.8 (2.5–3.0).

DISTRIBUTION. Mid-southern United States west to Texas.

LOCALITIES. Arkansas. Greene Co.: Paragould (MSU); Hempstead Co.: Hope (MCZ). Kentucky. No locality (AM). Louisiana. Caddo Co.: Shreveport (UA); East Baton Rouge Co.: Baton Rouge (UA); Evangeline Co.: Lake Chicot State Park (TLE). Texas. Brazos Co.: College Station (TAM). Navarra Co.: Corsicana (USNM).

DISCUSSION. See above.

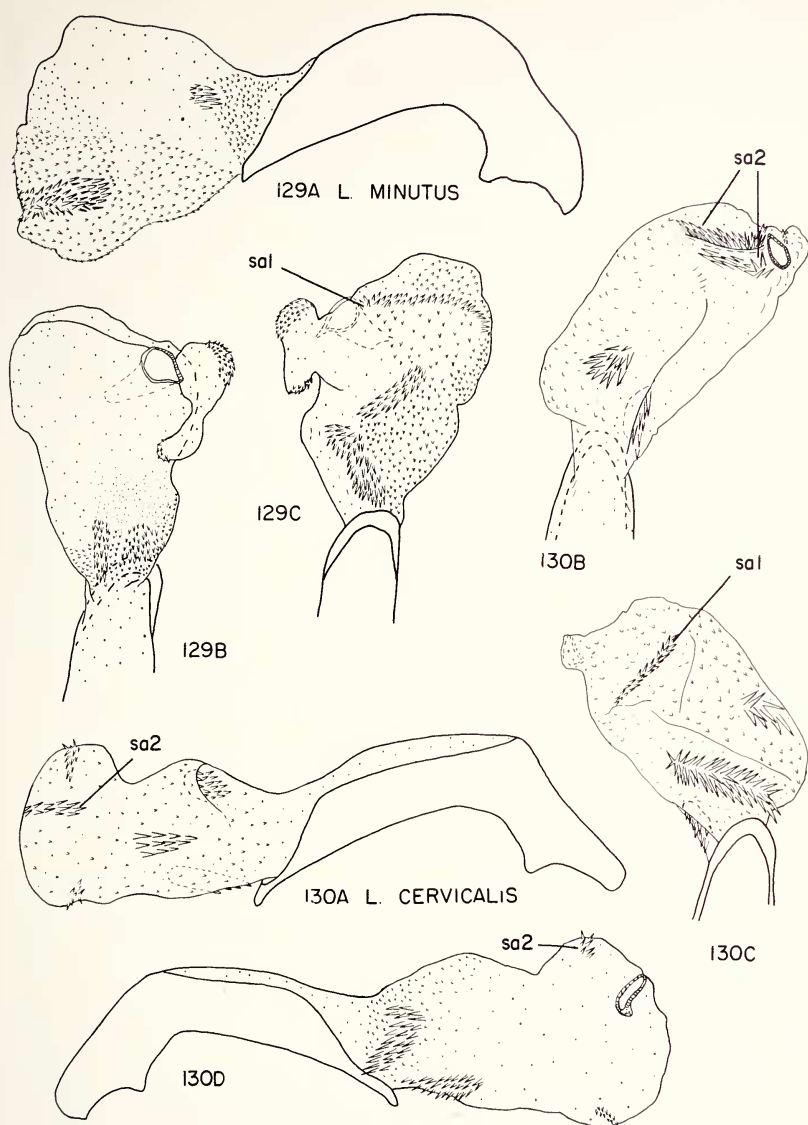
26. *Loxandrus cervicalis* Casey

Figs. 63; 130 A, B, C; 176

Loxandrus cervicalis Casey, 1918:385. Holotype. ♂. One male specimen from Sarasota, Florida. Type No. 47340. (USNM).

Loxandrus brunneus Blatchley, 1918:417. Holotype. ♂. Type locality, Lake Okeechobee, four miles southeast of Moore Haven, March 1–3 (PU).

DESCRIPTION. *Color*. Dorsal: black, shining, elytra iridescent. Ventral: black to dark brown. Appendages: mostly black to dark brown but sometimes straw yellow. *Head*. Clypeus: anterior margin usually straight, sometimes very slightly concave. Epistomal and subgenal sutures distinct, complete. Frontal sulci: short, broad, shallow. Microsculpture: clypeus, frons and vertex isodiametric. Mentum: apex of lobes narrowly rounded; tooth not as long as lobes; furrows and foveae absent; microsculpture isodiametric. *Thorax*. Pronotum: microsculpture distinct, elongate; lateral margins evenly rounded their entire length, not sinuate posteriorly; posterior angles rounded; anterior marginal sulcus complete; posterior marginal sulcus reaching just past basal foveae but incomplete; median sulcus present, reaching anterior sulcus but not posterior margin; basal impressions elongate, sparsely punctate; area between basal impressions sparsely punctate; area between basal impressions and lateral margins impunctate. Scutellum: apex pointed; microsculpture isodiametric. N. B. Ventral surface of thorax impunctate. Prosternum: microsculpture elongate medially, becoming isodiametric towards the lateral margins. Proepisternum: microsculpture isodiametric. Proepimeron: microsculpture elongate. Mesosternum: microsculpture elongate. Mesepisternum: microsculpture elongate and isodiametric. Metasternum: microsculpture elongate or absent in median areas, isodiametric towards the lateral margins.



FIGS. 129-130. Male genitalia, IS everted. 129 A. *L. minutus* n. sp., right lateral aspect. 129 B. Same, dorsal aspect. 129 C. Same, ventral aspect. 130 A. *L. cervicalis* Casey, right lateral aspect. 130 B. Same, left lateral aspect. 130 C. Same, ventral aspect.

Metepisternum: microsculpture isodiametric. Metepimeron: microsculpture if present elongate. *Legs.* Hind coxae: microsculpture on inner surface elongate. Tarsi: segments 1–3 of middle and hind tarsi and 4 of hind tarsi grooved dorso-laterally. *Elytra.* Microsculpture absent; striae 7 weakly impressed basally, other striae all distinct, trough 1 isodiametric unit wide; internal plica well developed; humeri rounded; microsculpture of epipleura absent. *Abdominal sternites.* Microsculpture elongate medially, becoming isodiametric laterally; impunctate; segments 1 and 2 weakly rugose at base; ambulatory setae sometimes present on segment 2. *Aedeagus.* Median lobe: not modified. Internal sac: everts in a median position; six distinct scale groups present; remainder of the sac's surface covered with small weakly sclerotized scales; sclerotized ring present. *Measurements.* (17 specimens). TL—6.5 (6.2–7.2); WH—1.3 (1.2–1.5); WP—2.0 (1.9–2.2); WW—2.6 (2.5–2.9).

DISTRIBUTION. Southeastern United States, Florida to Arkansas.

LOCALITIES. Arkansas. Lonoke Co.: Carlisle (CAS). Florida. DeSoto Co.: Arcadia (GB); Duval Co.: Jacksonville (OSU); Hernando Co.: Brooksville (CAS); Highland Co.: Archbold Biological Station, Lake Placid (CU, PSU); Hillsborough Co.: Tampa (USNM); Indian River Co.: Sebastian River (USNM); Levy Co.: No locality (FSPB); Pinellas Co.: Bellair (AM, USNM); Dunedin (PU); Sarasota Co.: Sarasota (CAS); Volusia Co.: New Smyrna (CAS). *Sand Pt. (USNM).

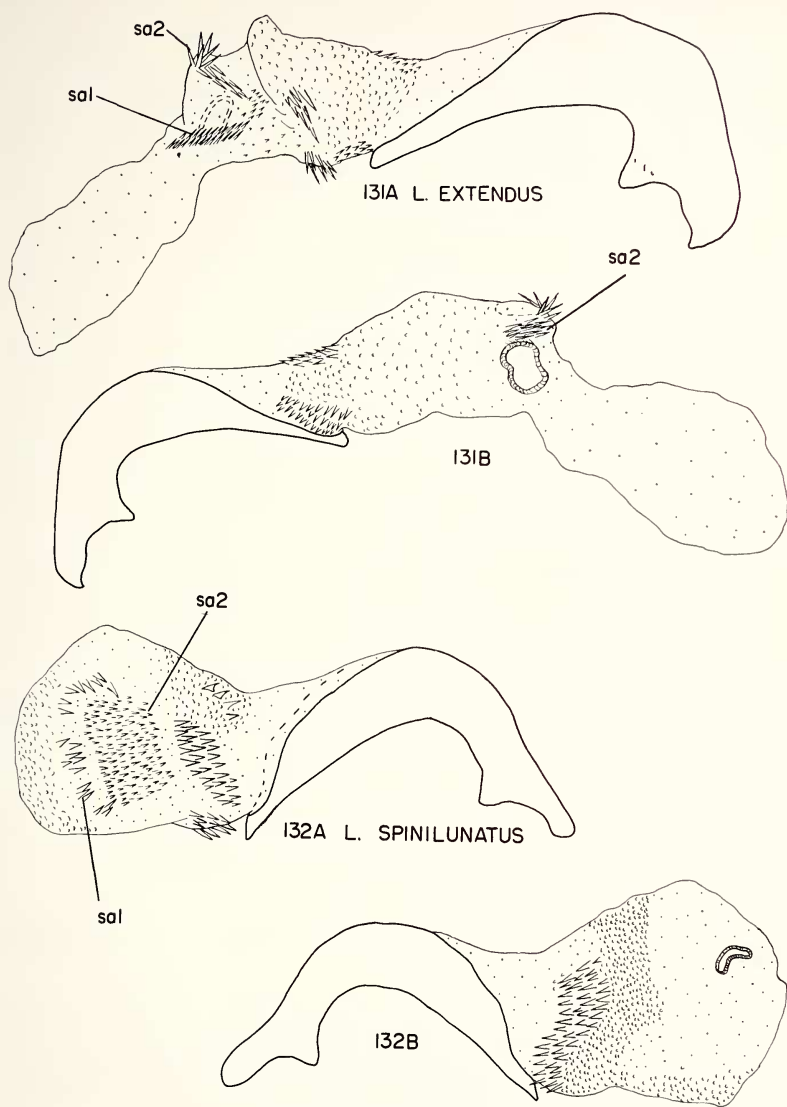
DISCUSSION. See above.

27. *Loxandrus spinilunatus* New Species

Figs. 64; 132 A, B

HOLOTYPE. ♂. Arkansas. Collector Stromb?; Frederick Blanchard Collection (MCZ). Paratype. 1 ♂ (UM).

DESCRIPTION. *Color.* Dorsal surface: black, iridescent; ventral surface: dark brown to black; appendages: dark to reddish brown. *Head.* Clypeus: anterior margin slightly concave. Epistomal and subgenal sutures: obscure but complete. Frontal sulci: obscure, short, broad, shallow. Microsculpture: clypeus, frons and vertex, sometimes weak, isodiametric. Mentum: apex of lobes narrowly rounded; tooth almost as long as lobes (mentum transverse); furrows absent; deep foveae present; microsculpture, where present, elongate. *Thorax.* Pronotum: microsculpture on disk distinct, slightly elongate; lateral margins evenly rounded, not sinuate posteriorly; posterior angles rounded; anterior marginal sulcus complete; posterior marginal sulcus reaching past basal foveae but not complete; median sulcus reaching anterior marginal sulcus but not posterior margin; basal



FIGS. 131-132. Male genitalia, IS everted. 131 A. *L. extendus* n. sp., right lateral aspect. 131 B. Same, left lateral aspect. 132 A. *L. spinilunatus* n. sp., right lateral aspect. 132 B. Same, left lateral aspect.

impressions elongate, moderately deep, punctate; area between impressions sparsely punctate; area between impressions and lateral margins impunctate. Scutellum: microsculpture isodiametric; apex pointed. N. B. Entire ventral surface impunctate. Prosternum: microsculpture elongate, more distinct laterally. Proepisternum: microsculpture isodiametric. Proepimeron: microsculpture isodiametric and elongate. Mesosternum: microsculpture elongate. Mesepisternum: microsculpture isodiametric. Metasternum: microsculpture isodiametric laterally, elongate medially. Metepisternum: microsculpture isodiametric. Metepimeron: microsculpture, elongate. *Legs*. Hind coxae: microsculpture on inner surface elongate. Tarsal segments: 1–3 of middle and hind tarsi and 4 of hind tarsi grooved dorso-laterally. *Elytra*. Microsculpture on intervals absent; all striae (except 7 toward base) distinct, punctate, trough 1 (sometimes 2) isodiametric units wide; internal plica well developed; humeri rounded; microsculpture of epipleura absent. *Abdominal sternites*. Microsculpture elongate medially, isodiametric laterally; impunctate; segments 1–4 rugose laterally near the base; ambulatory setae present on segment 2 (in one specimen). *Aedeagus*. Median lobe: not modified. Internal sac: six distinct scale groups arranged in complex manner; most of the remainder of the sac's surface covered with small weakly sclerotized scales; sclerotized ring present. *Measurements*. (2 specimens). TL—7.5 (7.1–7.8); WH—1.4 (1.3–1.5); WP—2.4 (2.2–2.5); WW—2.9 (2.7–3.0).

DISTRIBUTION. Central Southern United States.

LOCALITIES. Arkansas. Undetermined locality. (MCZ). Louisiana. Unrecorded locality (UM).

DISCUSSION. See above.

28. *Loxandrus nocticolor* Darlington

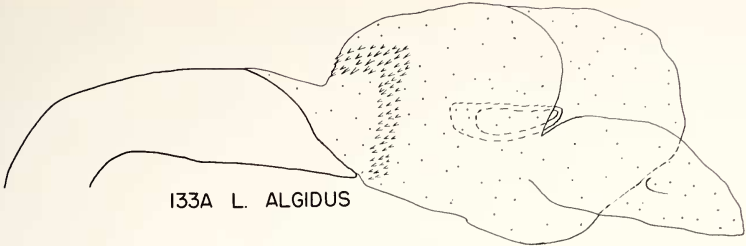
Fig. 135; 144

Loxandrus nocticolor Darlington 1934:91. *Holotype*. ♂. Cuba, Soledad (near Cienfuegos), October 21, 1926. P. J. Darlington, Jr., Coll. Type No. 19512 (MCZ).

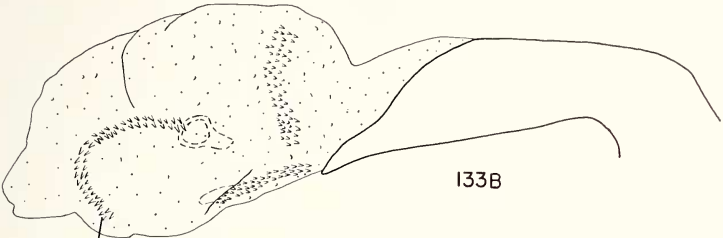
DESCRIPTION. *Color*. Dorsal: black, shining. Ventral: reddish-brown to black, shining. Appendages: black to reddish brown, some-

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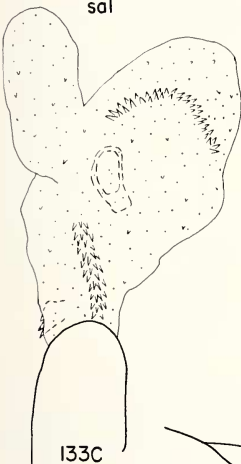
FIGS. 133–134. Male genitalia, IS everted, basal $\frac{1}{4}$ to $\frac{1}{2}$ of median lobe not illustrated. 133 A. *L. algidus* n. sp., left lateral aspect. 133 B. Same, right lateral aspect. 133 C. Same, ventral aspect. 134 A. *L. velox* (Dej.), right lateral aspect. 134 B. Same, left lateral aspect.



I33A L. ALGIDUS

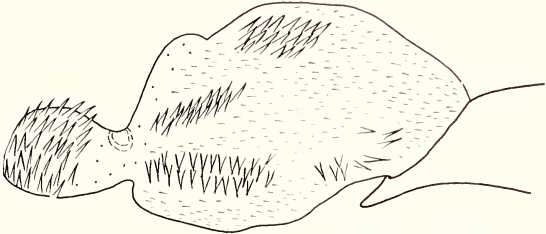


I33B

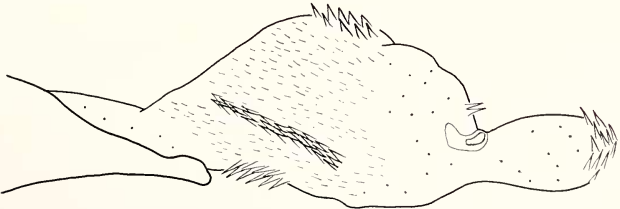


sal

I33C



I34A L. VELOX



I34B

times tinged with yellow. *Head*. Clypeus: anterior margin, almost straight. Epistomal and subgenal suture: complete, weak laterally. Frontal sulci: obscure, broad, shallow. Microsculpture: clypeus, frons and vertex distinct, isodiametric. Mentum: apex of lobes rounded; tooth distinct, apex rounded; furrows and foveae absent; microsculpture distinct, slightly elongate. *Thorax*. Pronotum: microsculpture present and isodiametric along the reflexed lateral margins and in the basal impressions, otherwise absent; lateral margins evenly rounded their entire distance, not sinuate posteriorly; posterior angles rounded; anterior marginal sulcus incomplete; posterior marginal sulcus reaching only to basal impressions; median sulcus not reaching anterior or posterior margins; basal impressions moderately deep, broad, elongate, punctate; area between impressions sparsely punctate; area between impressions and lateral margins with a few punctures at most. Scutellum: microsculpture weak, isodiametric; apex pointed. N. B. Entire ventral surface impunctate. Prosternum: microsculpture elongate medially, isodiametric laterally. Proepisternum and proepimeron: microsculpture isodiametric and elongate. Mesosternum: microsculpture slightly elongate. Mesepisternum: microsculpture isodiametric anteriorly becoming elongate posteriorly and absent in posterior half to quarter. Metasternum and Metepisternum: microsculpture absent or very elongate. Metepimeron: microsculpture absent. *Legs*. Hind coxae: microsculpture on inner surface absent. Tarsi: segments 1-4 of middle and hind tarsi grooved on outside lateral margin only. *Elytra*. Microsculpture on intervals absent; all striae distinct, impunctate, trough 3-4 isodiametric units wide; internal plica well developed; humeri rounded; microsculpture on epipleura absent. *Abdominal sternites*. Microsculpture elongate medially, isodiametric laterally; impunctate; segments 1-4 sparsely rugose laterally. *Aedeagus*. Median lobe: not modified. Internal sac: no distinct scale groups present, much of the sac's surface covered with small, weakly sclerotized scales; sclerotized ring absent. *Measurements*. (1 ♀ specimen). TL—10.6; WH—2.0; WP—3.0; WW—4.1.

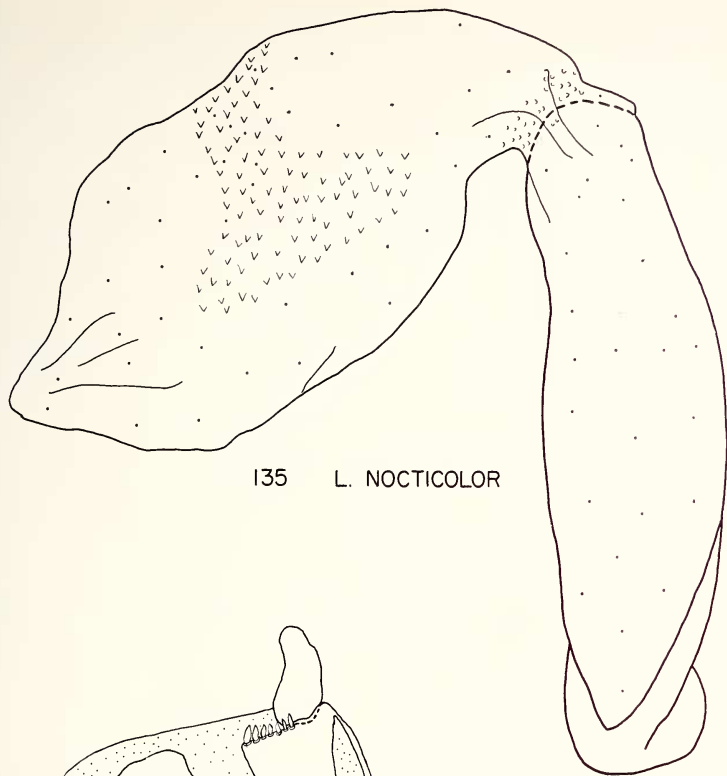
DISTRIBUTION. West Indies.

LOCALITIES. WEST INDIES. Cuba. Soledad (near Cienfuegos).

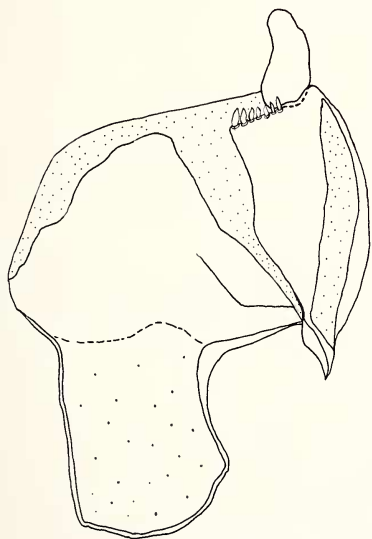
DISCUSSION. This species was originally described by Darlington in 1934. I have examined the holotype and found it to be a valid

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FIGS. 135-137. 135. Male genitalia, IS everted, dorsal aspect, *L. nocticolor* Darl. Figs. 136-137. Female genitalia, ventral aspect. 136. *L. rectus* (Say). 137. *L. pravitubus* n. sp.



135 L. NOCTICOLOR



136 L. RECTUS



137 L. PRAVITUBUS

species. The above description is based on a female given to me by Dr. Darlington. The external characters of this species appear to be rather distinct.

THE *L. rossi*, *L. algidus*, *L. parallelus*, *L. unilobus*,
L. velox AND *L. taeniatus* COMPLEX

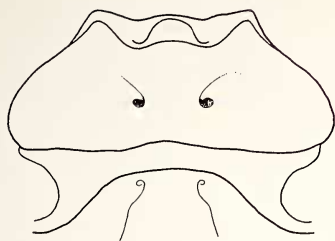
These six species closely resemble one another and cannot be distinguished using external characters. Identification is based on characters associated with the male genitalia. *Loxandrus parallelus*, *L. unilobus* and *L. taeniatus* have been keyed out in other places in the key and discussed previously. The description of *L. algidus* is based on two specimens collected in Maryland from an undetermined locality. There were no data with the specimens indicating at what time of the year they were collected. The description of *L. rossi* is based on seven specimens from Arkansas, Georgia, and Alabama. It has been collected in June at all three localities. *L. velox* was described by Dejean in 1828 from specimens sent to him by LeConte. The type locality was given only as "Amer. Sept." The specimens in the Paris Museum are the only ones belonging to this species I have seen. There are 2 males and 2 females in the series. One of the females is recorded from Louisiana. The description used in this paper is based on notes taken on the Paris Museum type.

29. *Loxandrus rossi* New Species

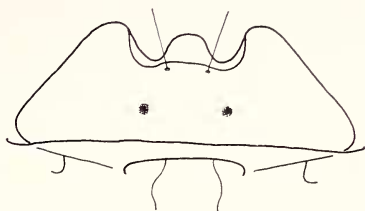
Figs. 61; 126 A, B; 174

HOLOTYPE. ♂. Arkansas. Greene County, Paragould, J. Eichemer, Collector, June 14, 1958, (MSU). *Paratypes*. 2 ♂♂ (CAS); 1 ♂ (USNM); 1 ♂ (MCZ); 1 ♂ (TLE); 1 ♂ (UA).

DESCRIPTION. *Color*. Dorsal: black, shining. Ventral: dark to reddish brown. Appendages: dark to reddish brown. *Head*. Clypeus: anterior margin slightly concave. Epistomal and subgenal sutures: obscure but complete. Frontal sulci: almost absent, broad, shallow. Microsculpture: clypeus, foveae and vertex isodiametric. Mentum: apex of lobes rounded; tooth not as long as lobes; furrows and foveae absent; microsculpture slightly elongate. *Thorax*. Pronotum: microsculpture on disk elongate; lateral margin evenly reflexed the entire distance, not sinuate posteriorly; posterior angles rounded; anterior marginal sulcus complete; posterior marginal sulcus reaching past basal impressions but incomplete; median sulcus reaching anterior marginal sulcus but not posterior margin; basal impressions elongate, moderately deep, punctate; area between basal impressions sparsely punctate; area between basal impressions and lateral margins usually impunctate.



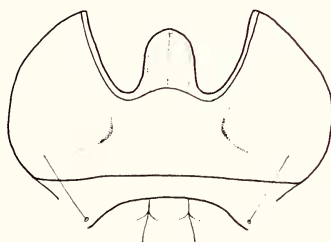
138 L. MICANS



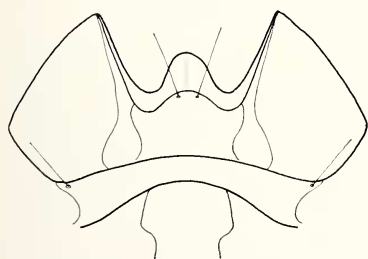
139 L. PACTINULLUS



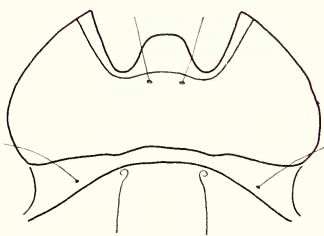
140 L. DURYI



141 L. INFIMUS



142 L. SAPHYRINUS



143 L. MINUTUS

FIGS. 138-143. Mentum. 138. *L. micans* Chaud. 139. *L. pactinullus* n. sp. 140. *L. duryi* Wright. 141. *L. infimus* Bates. 142. *L. saphyrinus* (Chaud.). 143. *L. minutus* n. sp.

Scutellum: microsculpture isodiametric; apex pointed. N. B. Entire ventral surface impunctate. Prosternum: microsculpture where present elongate. Proepisternum: microsculpture elongate and isodiametric. Mesosternum: microsculpture slightly elongate. Mesepisternum: microsculpture elongate. Metasternum, Metepisternum and Metepimeron: microsculpture elongate. *Legs*. Hind coxae: microsculpture on inner surface elongate. Tarsal segments: 1–3 of middle and hind tarsi and 4 of hind tarsi grooved dorso-laterally. *Elytra*. Microsculpture absent on intervals; all striae distinct, punctate, trough 1 isodiametric unit wide; internal plica well developed; humeri rounded; microsculpture of epipleura absent. *Abdominal sternites*. Microsculpture elongate medially, isodiametric laterally; impunctate; segments 1–4 rugose laterally near the base; ambulatory setae present on segment 2. *Aedeagus*. Median lobe: not modified. Internal sac: everts in a median position; directed dorsally; four distinct scale groups present; most of the remainder of the sac's surface covered with small weakly sclerotized scales; sclerotized ring present, opens on the right side. *Measurements*. (8 specimens). TL—6.9 (6.7–7.2); WH—1.3 (1.2–1.4); WP—2.2 (1.7–1.9); WW—2.7 (2.6–2.9).

DISTRIBUTION. Southern United States.

LOCALITIES. Alabama. *Tumblin Gap (CAS, MCZ, USNM). Arkansas. Greene Co.: Paragould (MSU). Georgia. Bibb Co.: 5 mi. SE. Macon (TLE).

DISCUSSION. See above.

30. *Loxandrus algidus* New Species

Figs. 66; 133 A, B, C; 176

HOLOTYPE. ♂. Maryland. Otto Lugger Collection (UM). Paratypes. 1 ♂ (UM).

DESCRIPTION. *Color*. Dorsal: black, shining, elytra iridescent. Ventral: black to dark brown. Appendages: dark to light brown, sparsely tinged with black. *Head*. Clypeus: anterior margin slightly concave. Epistomal suture: distinct, complete. Subgenal suture: obscure but complete. Frontal sulci: obscure, shallow, broad, short. Microsculpture: clypeus, frons and vertex isodiametric. Mentum: apex of lobes narrowly rounded; tooth distinct, not as long as lobes; furrows more or less absent; fovae absent; microsculpture slightly elongate. *Thorax*. Pronotum: microsculpture absent or very weak,

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FIGS. 144–146. Geographical distribution maps. 144. *L. infimus* Bates, *L. nocticolor* Darl. 145. *L. elongatus* n. sp. 146. *L. rectangulus* LeC.



slightly elongate if visible; lateral margins evenly rounded their entire length, not sinuate posteriorly; posterior angles rounded; anterior marginal sulcus complete; posterior marginal sulcus reaching past basal impressions but incomplete; median sulcus reaching anterior marginal sulcus but not posterior margin; basal impressions elongate, moderately deep, broad, punctate; area between basal impressions sparsely punctate; area between impressions and lateral margins impunctate. Scutellum: microsculpture isodiametric; apex pointed. N. B. Entire ventral surface impunctate. Prosternum: microsculpture absent medially, elongate laterally. Proepisternum and proepimeron: microsculpture elongate. Mesosternum: microsculpture absent or very elongate. Mesepisternum: microsculpture isodiametric anteriorly, elongate medially. Metasternum: microsculpture absent medially, weakly present, elongate, laterally. Metepisternum: microsculpture absent or very elongate. Metepimeron: microsculpture absent. *Legs*. Hind coxae: microsculpture on inner surface absent or very elongate. Tarsi: segments 1–3 of middle and hind tarsi and sometimes 4 of hind tarsi grooved dorso-laterally. *Elytra*. Microsculpture on intervals absent; all striae, except basal quarter of 7, distinct, punctate, trough 1 (sometimes 2) isodiametric units wide; internal plica well developed; humeri rounded; microsculpture of epipleura absent. *Abdominal sternites*. Microsculpture elongate medially, becoming more isodiametric laterally; impunctate; segments 1–4 weakly rugose laterally towards the base; segment 2 with ambulatory setae. *Aedeagus*. Median lobe: not modified. Internal sac: everts medially, only slightly directed dorsally; five distinct scale groups present; most of the remainder of the sac's surface covered with small weakly sclerotized scales; a secondary sac everts from the left lateral side; sclerotized ring present. *Measurements*. (2 specimens). TL—6.2 (6.0–6.4); WH—1.3 (None); WP—2.0 (1.9–2.0); WW—2.5 (none).

DISTRIBUTION. Eastern United States.

LOCALITIES. Known from one undetermined locality in Maryland (UMIN).

DISCUSSION. See above.

31. *Loxandrus crenatus* LeConte

Figs. 40; 104; 162

Loxandrus crenatus LeConte 1852:252. ♂. No locality label. MCZ. Type No. 5701 (MCZ). Four additional specimens in the MCZ series from Tampa, Capron and Enterprise, Florida.

DESCRIPTION. *Color*. Dorsal: reddish-brown, shining. Ventral: reddish-brown, shining. Appendages: reddish-brown to straw yellow.

Head. Clypeus: anterior margin straight. Epistomal suture: complete. Subgenal suture: usually present, sometimes obscure or absent. Frontal sulci: obscure or absent, broad, shallow; anterior tentorial pits in this species deep. Microsculpture: clypeus, frons and vertex weak, isodiametric. Mentum: apex of lobes pointed or narrowly rounded; tooth distinct, almost as long as lobes; furrows shallow; foveae deep, distinct; microsculpture absent or very elongate. *Thorax.* Pronotum: microsculpture absent; lateral margins weakly sinuate posteriorly; posterior angles acute, slightly turned outward; anterior marginal sulcus absent; posterior marginal sulcus reaching only to basal impressions; median sulcus not reaching anterior or posterior margins; basal impressions moderately deep, elongate, punctate; area between basal impressions with only 1–2 punctures if any; area between basal impressions and lateral margin impunctate. Scutellum: microsculpture absent; apex pointed. N. B. Entire ventral surface without microsculpture. Prosternum, proepisternum, proepimeron: impunctate. Mesosternum: impunctate. Mesepisternum: coarsely punctate in anterior quarter. Metasternum: coarsely punctate laterally. Metepisternum: coarsely punctate. Metepimeron: impunctate. *Legs.* Hind coxae: microsculpture on inner surface absent. Tarsi: segments 1–3 of middle and hind tarsi grooved dorso-laterally. *Elytra.* Microsculpture on intervals absent; all striae distinct, distinctly punctate, microsculpture in trough usually absent, if present 1–2 units wide; internal plica well developed; humeri rounded; microsculpture of epipleura absent. *Abdominal sternites.* Microsculpture absent; basal margin of segment 1 punctate; segments 1–4 rugose laterally or not. *Aedeagus.* Median lobe: not modified. Internal sac: everts medially, turned to the left side and coiled at the apex; 1 small distinct scale group present; sclerotized ring is questionable, much of the apex appears to be sclerotized, the sclerotized ring seems to be in this area; most of the remainder of the sac's surface covered with small weakly sclerotized scales. *Measurements.* (15 specimens). TL—5.8 (4.9–6.2); WH—1.2 (1.0–1.3); WP—1.8 (1.5–1.9); WW—2.3 (2.0–2.5).

DISTRIBUTION. Southern United States.

LOCALITIES. Alabama. Mobile Co.: Mobile (CAS, USNM), Spring Hill (CAS). Florida. Duval Co.: Jacksonville (CAS); Highlands Co.: Archbold Biological Station at Lake Placid (CU, PSU), Highlands Hammock (TLE); Hillsborough Co.: Tampa (USNM); Lucie Co.: Capron (Ft. Capron on old maps?) (USNM); Manatee Co.: Oneco (GB); Pinellas Co.: Dunedin (PU); Polk Co.: Lakeland (AM); Sarasota Co.: Myakka River State Park (TLE); Taylor Co.: Steinhatchee (USNM); Volusia Co.: Coronado Bch. (CU), Enterprise (MSU). *Sand Point

(USNM). *Haw Crk. (USNM). *Royal Palm (PU). Unrecorded localities (MCZ, MSU, USNM). Georgia. Decatur Co.: Brawbridge (CAS). Louisiana. Vernon Co.: Rosepine (UA). Unrecorded locality (UM). Mississippi. Perry Co.: Richton (CU). South Carolina. Florence Co.: Rainwater (USNM). No state, no locality (MCZ).

DISCUSSION. This is one of the more distinct species of smaller *Loxandrus*. Once seen it is difficult to confuse it with other species in the genus. Its highly shining surface, distinct punctate striae and brown color are characteristic. It has been collected in the months of February, March, April, May, June, August, September and November. The specimens from Rosepine, Louisiana, were collected in a black light trap.

THE *L. micans*, *L. vitiosus* AND *L. duryi* COMPLEX

This is another group of closely related *Loxandrus* species. The external characters are very similar and identification must be based on characters associated with the aedeagi of the males. Even these characters show a great deal of resemblance. *Loxandrus micans* was described by Chaudoir from specimens from Opelousas, Louisiana. Two additional localities, Memphis, Tennessee, and the White River-Interstate 40 highway intersection, Arkansas, are known for this species. It has been collected in March, May and December. *L. vitiosus* is known from a number of localities throughout the Eastern United States. It has been collected in the months of January, March, April, June, July, September and December. *L. duryi* was described by Wright from Clermont Co., Ohio. Present data indicate that there is also a distinct population in Louisiana and Texas. It has been collected in the months of January, February, March, May, June, July and August.

32. *Loxandrus micans* Chaudoir

Figs. 39; 108 A, B, C; 165

Loxandrus micans Chaudoir 1868:342. *Holotype*. ♂. The first specimen in the series of three bears a red type label plus a small data label. The specimen is from Opelousas, Louisiana, taken here to be the type locality.

DESCRIPTION. *Color.* Dorsal surface: black or dark brown, shining; sometimes with central orange spot apically on the elytra;

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FIGS. 147-148. Geographical distribution maps. 147. *L. celeris* (Dej.). 148. *L. cubanus* Tschit., *L. remotus* n. sp.



elytra iridescent. Ventral surface: black or dark brown. Appendages: dark to light brown. *Head*. Clypeus: anterior margin slightly concave. Epistomal suture: obscure medially, absent laterally. Subgenal suture: obscure. Frontal sulci: obscure, shallow, broad. Microsculpture: clypeus, frons and vertex distinct, isodiametric. Mentum: apex of lobes rounded; tooth large, broadly rounded at apex, almost as long as lobes; furrows absent; fovae distinct, deep; microsculpture isodiametric and elongate. *Thorax*. Pronotum: microsculpture absent on the disk, weakly present laterally; lateral margins evenly rounded their entire length, not sinuate posteriorly, weakly punctate in posterior quarter to half; posterior angles rounded; anterior marginal sulcus incomplete; posterior marginal sulcus reaching past basal impressions but incomplete; median sulcus present but not reaching anterior or posterior margins; basal impressions moderately deep, elongate, narrow, punctate; area between basal impressions sparsely punctate; area between basal impressions and lateral margins with only 1–2 punctures. Scutellum: apex pointed; microsculpture isodiametric. Prosternum: microsculpture absent medially, weakly present laterally; impunctate. Proepisternum and proepimeron: microsculpture absent; impunctate. Mesosternum: microsculpture isodiametric; impunctate. Mesepisternum: microsculpture absent; anterior three quarters punctate. Metasternum: microsculpture absent except around middle coxae; punctate toward lateral margin. Metepisternum: microsculpture absent; punctate. Metepimeron: microsculpture absent; impunctate. *Legs*. Hind coxae: microsculpture on inner surface absent. Tarsi: segments 1–3 of middle and hind tarsi grooved dorso-laterally. *Elytra*. Microsculpture on intervals absent; all striae distinct, punctate, trough 1–2 isodiametric units wide or totally absent; internal plica well developed; humeri rounded; microsculpture of epipleura absent. *Abdominal sternites*. Microsculpture weak, elongate; segment 1 punctate along basal margin; segments 1–5 rugose laterally. *Aedeagus*. Median lobe: not modified. Internal sac: everts medially, slightly directed dorsally: 3 distinct scale groups and possibly a fourth on the main sac; a secondary sac protrudes from the left side of the main sac; secondary sac with a scale group at its apex; sclerotized ring present on the left dorso-lateral surface. *Measurements*. (3 specimens). TL—6.3 (6.1–6.5); WH—1.3 (none); WP—2.1 (2.0–2.1); WW—2.6 (none).

DISTRIBUTION. Eastern United States.

LOCALITIES. Arkansas. Prairie Co.: Rest stop on Interstate 40 at White River bridge (UA). Tennessee. Shelby Co.: Memphis (USNM).

DISCUSSION. See above.

33. *Loxandrus vitiosus* New Species

Figs. 41; 110 A, B, C; 167

HOLOTYPE. ♂. Arkansas. Howard Co., 4 mi. W. Mineral Springs, Rte. 27, July 12, 1968. River bottom debris, R. T. Allen and J. W. Stewart (UA). Paratypes. 5 ♂♂ (CAS); 10 ♂♂ (CU); 1 ♂ (GB); 12 ♂♂ (MCZ); 1 ♂ (NCSC); 2 ♂♂ (OSU); 4 ♂♂ (UA); 6 ♂♂ (USNM); 1 ♂ (PU); 2 ♂♂ (CU).

DESCRIPTION. *Color*. Dorsal: black shining; apical area of elytra sometimes with an orange spot. Ventral: black to dark brown. Appendages: black to dark brown or dark to reddish brown. *Head*. Clypeus: anterior margin slightly concave. Epistomal and subgenal sutures: distinct, complete. Frontal sulci: vaguely present. Microsculpture: clypeus, frons and vertex isodiametric. Mentum: transverse; lobes narrowly rounded; tooth distinct, blunt at apex, almost as long as lobes; furrows absent; foveae distinct, deep; microsculpture elongate. *Thorax*. Pronotum: microsculpture usually absent; if present, elongate; lateral margins sparsely punctate posteriorly, evenly rounded their entire length, not sinuate posteriorly; posterior angles rounded; anterior marginal sulcus complete; posterior marginal sulcus reaching past basal foveae but incomplete; median sulcus reaching anterior sulcus or not, never reaching posterior margin; basal impressions elongate, moderately deep, punctate; area between basal impressions sparsely punctate; area between basal impression and lateral margins punctate or not; if punctate, punctures near lateral or posterior margins. Scutellum: microsculpture isodiametric; apex pointed. Prosternum: microsculpture absent medially, elongate toward the lateral margin; impunctate. Proepisternum and proepimeron: microsculpture weak, elongate; impunctate. Mesosternum: microsculpture elongate; impunctate. Mesepisternum: microsculpture usually absent; if present, elongate; punctate in anterior half. Metasternum: microsculpture present only laterally and around mesocoxae, elongate; punctate laterally. Metepisternum: microsculpture, if present, elongate; punctate. Metepimeron: microsculpture usually absent or very elongate; impunctate. *Legs*. Hind coxae: microsculpture on inner surface absent or weak and elongate. Tarsi: segments 1–3 and sometimes 4 (obscure) grooved dorso-laterally. *Elytra*. Microsculpture on intervals absent; striae 1–6 and 8 distinct, punctate, basal quarter of striae 7 not as distinct as others, trough 1–2 isodiametric units wide; internal plica well developed; humeri rounded; microsculpture on epipleura absent. *Abdominal sternites*. Microsculpture isodiametric laterally, becoming elongate and then absent medially; basal and lateral areas of segment 1

and sometimes 2 punctate; segments 1–4 with basal and lateral areas rugose. *Aedeagus*. Median lobe: not modified. Internal sac: everts in a median position, slightly directed dorsally; 5 distinct scale groups on main sac; secondary sac everts toward the apex on the left side; secondary sac with a group of small scales at its apex; most of the remainder of the sac's surface covered with small, weakly sclerotized scales; sclerotized ring present, on left lateral surface. *Measurements*. (20 specimens). TL—6.4 (6.0–7.0); WH—1.4 (1.2–1.4); WP—2.2 (1.9–2.4); WW—2.7 (2.5–3.0).

DISTRIBUTION. Eastern United States west to Missouri, Arkansas, and Louisiana.

LOCALITIES. Alabama. Mobile Co.: Delchamps (CAS), Mobile (MCZ, OSU), Mt. Vernon (CU); Tuscaloosa Co.: Tuscaloosa (GB). Arkansas. Howard Co.: 4 mi. W. Mineral Springs, Rte. #27 (UA). District of Columbia. Washington (MCZ, USNM). Florida. Unrecorded locality (OSU). Louisiana. East Baton Rouge Co.: Baton Rouge (UA). Mississippi. George Co.: Lucedale (CU); Green Co.: Leaksville (CU). Missouri. St. Louis Co.: St. Louis (MCZ). North Carolina. Hoke Co. (NCSC). Pennsylvania. Dauphin Co.; Harrisburg (CAS, MCZ, USNM). *Philadelphia Neck (OSU). Unrecorded localities in Pennsylvania (MCZ, USNM). Ohio. Hocking Co. (PU). Tennessee. Smith Co.: Elmwood (CAS). Virginia. Southampton Co.: Boykins (MCZ). *Blackpond (MCZ).

DISCUSSION. See above.

34. *Loxandrus duryi* Wright

Figs. 42; 109 A, B, C, D, E, F; 166

Loxandrus duryi Wright 1939:1. Holotype. Not examined. Wright stated in his original description "Holotype male and female are in my collection." Mr. Charles Oehler (personal communication) of the Cincinnati Museum of Natural History informs me that he has been unable to locate the type specimen of this species. I have, however, examined paratypes and numerous specimens from the type locality. Based on a study of this material, I am tentatively assuming the holotype to be the same as the paratypes and other specimens collected at the type locality. The type locality is near Goshen, Ohio, in Clermont County.

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FIGS. 149–151. Geographical distribution maps. 149. *L. discolor* n. sp., *L. spinigrandis* n. sp., *L. tropicus* n. sp., *L. lepidus* n. sp. 150. *L. whiteheadi* n. sp., *L. unispinus* n. sp. 151. *L. balli* n. sp.



DESCRIPTION. *Color.* Dorsal: black, shining, elytra sometimes with central orange spot near the apex. Ventral: usually black, sometimes dark to light brown. Appendages: dark to light brown to straw yellow. *Head.* Clypeus: anterior margin feebly concave. Epistomal and subgenal suture: finely produced but complete. Frontal sulci: obscure, short, shallow. Microsculpture; clypeus, frons and vertex weak, isodiametric. Mentum: apex of lobes rounded; tooth as long as or almost as long as lobes, truncate at apex; furrows absent; foveae distinct, deep; microsculpture isodiametric and elongate. *Thorax.* Pronotum: microsculpture absent; lateral margins evenly rounded, not sinuate posteriorly; sometimes weakly punctate posteriorly; posterior angles rounded; anterior marginal sulcus complete; posterior marginal sulcus reaching past basal foveae but incomplete; median sulcus present as a fine line, reaching anterior marginal sulcus but not posterior margin; basal impressions elongate, moderately deep, punctate; area between basal impressions sparsely punctate; area between basal impressions and lateral margins usually impunctate. Scutellum: microsculpture isodiametric; apex pointed. Prosternum: microsculpture present only along lateral margins and procoxae; impunctate. Proepisternum and Proepimeron: microsculpture elongate; impunctate. Mesosternum: microsculpture isodiametric to elongate; impunctate. Mesepisternum: microsculpture elongate; punctate in anterior half. Metasternum: microsculpture more evident laterally, elongate; punctate laterally. Metepisternum: microsculpture weak, elongate; punctate. Metepimeron: microsculpture absent; impunctate. *Legs.* Hind coxae: microsculpture on inner surface weak, elongate. Tarsi: segments 1–3 of middle and hind tarsi and 4 of hind tarsi grooved dorso-laterally. *Elytra.* Microsculpture on intervals absent; all striae distinct, punctate, trough 1 isodiametric unit wide; internal plica well developed; humeri rounded; microsculpture of epipleura absent. *Abdominal sternites.* Microsculpture elongate medially, isodiametric laterally; impunctate; segments 1–3 rugose laterally and basally. *Aedeagus.* Median lobe: not modified. Internal sac: everts in a median position, slightly directed dorsally; 5 distinct scale groups present; most of the remainder of the sac's surface covered with small weakly sclerotized scales; sclerotized ring present, opening on the left side. *Measurements.* (17 specimens). TL—7.0 (6.8–7.3); WH—1.4 (1.3–1.5); WP—2.3 (2.1–2.3); WW—2.8 (2.6–2.9).

DISTRIBUTION. Eastern United States west to Texas.

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FIGS. 152–154. Geographical distribution maps. 152. *L. elnae* n. sp., *L. fraus* n. sp. 153. *L. sculptilis* Bates. 154. *L. pacticinullus* n. sp.



LOCALITIES. Indiana. Marion Co. (PU); St. Joseph Co.: Elkhart (MCZ); Virgo Co. Louisiana. Caddo Co.: Shreveport (UA); Evangeline Co.: Lake Chicot State Park (TLE). Ohio. Ashtabula Co.: Conneaut (PU); Athens Co.: Athens (UMIN); Clermont Co.: Goshen (CNC, USNM). Hamilton Co.: Cincinnati (UM); Licking Co.: Heborn (MSU); Putnam Co.: Ottawa TWP, Sec. 85, Blanchard River (PU); Washington Co.: Maritta (MSU). Unrecorded locality in Ohio (OSU). Pennsylvania. Allegheny Co. (CU). Texas. Dallas Co.: Dallas (MSU). Unrecorded locality in Texas (MCZ).

DISCUSSION. See above.

35. *Loxandrus spinigrandis* New Species

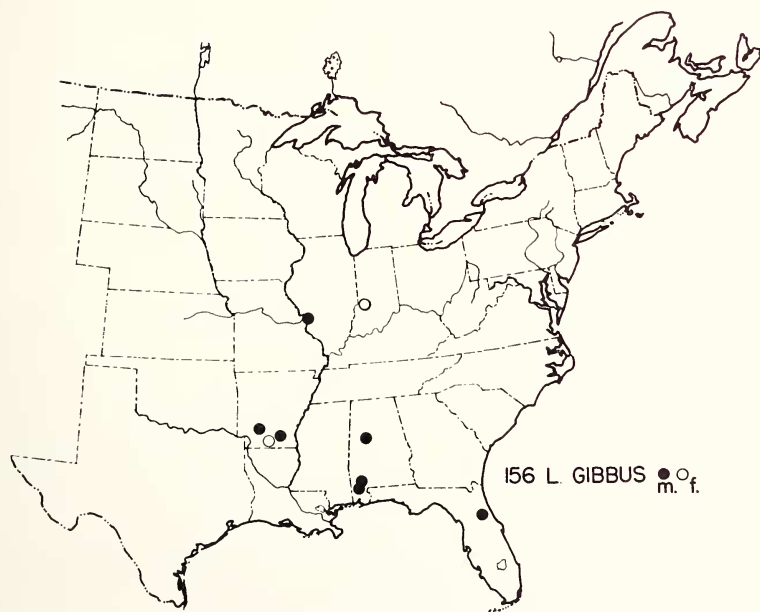
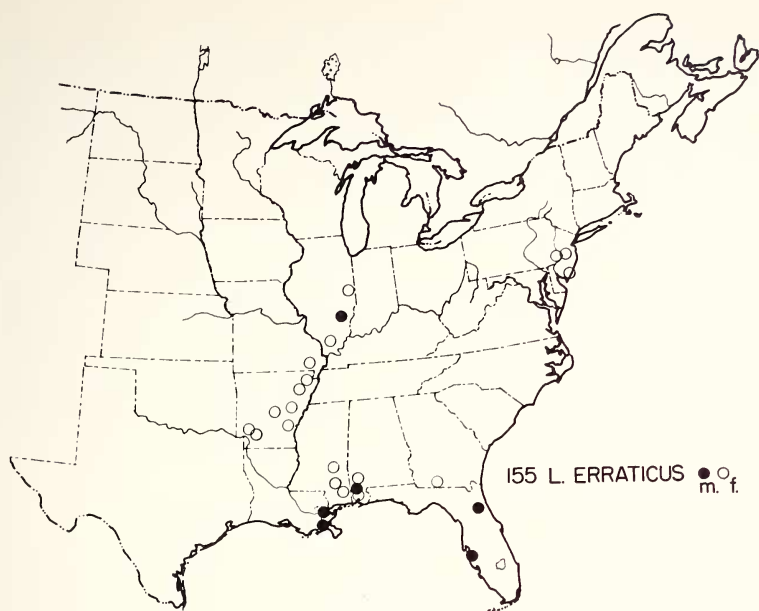
Figs. 26; 83 A, B; 149

HOLOTYPE. ♂. Canal Zone, Barro Colorado Island, 1947. Zetek, Collector, Lot 47-4230 (USNM). Paratypes. 1 ♂ 5 ♀ (USNM).

DESCRIPTION. *Color*. Dorsal: head usually black sometimes reddish brown to light yellow; pronotum black to reddish brown, lateral margins sometimes lighter in color than disk; elytra black to dark brown, a yellow spot near the humerus and towards the apex; apical spot may be faint or absent. Ventral: black to dark brown, apex of last abdominal segment yellow. Appendages: dark brown to yellow. *Head*. Clypeus: anterior margin straight. Epistomal suture: distinct, complete. Subgenal suture: usually distinct, sometimes obscure in females. Frontal sulci: shallow, broad, short. Microsculpture: clypeus, frons and vertex distinct, isodiametric. Mentum: lobes narrowly rounded; tooth distinct, not as long as lobes, rounded at apex; furrows present shallow; foveae present or absent, when present small and shallow; microsculpture absent. *Thorax*. Pronotum: microsculpture absent; lateral margins evenly rounded, not sinuate posteriorly, punctate their entire length or at least posterior three quarters; posterior angles rounded; anterior marginal sulcus complete; posterior marginal sulcus not reaching past basal impressions; median sulcus present, not reaching anterior marginal sulcus or posterior margin; basal impressions elongate, moderately impressed, punctate; area between impressions and between impressions and lateral margins sparsely punctate. Scutellum: microsculpture absent; apex pointed. N. B. Entire ventral surface without microsculpture. Prosternum: impunctate. Proepisternum: punctate. Proepimeron: impunctate. Mesosternum: impunctate. Mesepisternum: punctate in anterior quarter. Metaster-

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FIGS. 155-156. Geographical distribution maps. 155. *L. erraticus* Dej. 156. *L. gibbus* n. sp.



num: punctate laterally. Metepisternum: punctate. Metepimeron: impunctate. *Legs.* Hind coxae: microsculpture on inner surface absent. Tarsi: segments 1–3 of middle and hind tarsi grooved dorso-laterally. *Elytra.* Microsculpture on intervals absent; all striae distinct, punctate, trough 1 isodiametric unit wide; internal plica well developed; humeri rounded; microsculpture of epipleura absent. *Abdominal sternites.* Microsculpture absent; segment 1 punctate and rugose at base; segments 2–5 finely rugose laterally. *Aedeagus.* Median lobe: not modified. Internal sac: everts medially, deflected to the right side and coiled towards the apex; two parallel rows of large spines extending the length of the sac; distinct scale groups absent; most of the sac's surface covered with small weakly sclerotized scales; sclerotized ring absent. *Measurements.* (7 specimens). TL—7.6 (7.0–8.2); WH—1.5 (1.5–1.7); WP—2.5 (2.2–2.7); WW—3.3 (3.1–3.6).

DISTRIBUTION. Central America.

LOCALITIES. CANAL ZONE. Barro Colorado Island (USNM).

DISCUSSION. This species closely resembles *L. discolor* and *L. whiteheadi* in many external characters. It can readily be separated from these two species on the basis of the broadly explanate posterior lateral areas of the pronotum. This character is similar to the same condition that occurs in the distantly related *L. saphyrinus*. *L. spinigrandis* has been collected in the months of January, February, July, August, September and October.

36. *Loxandrus discolor* New Species

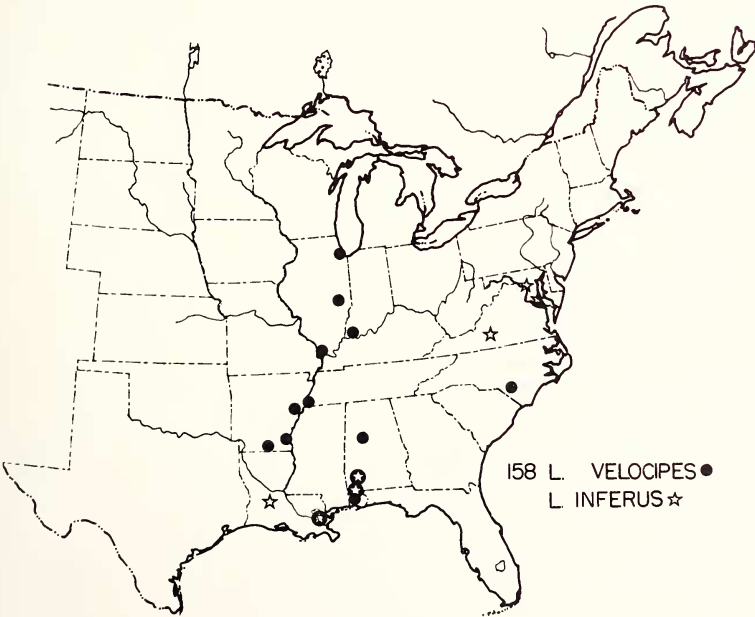
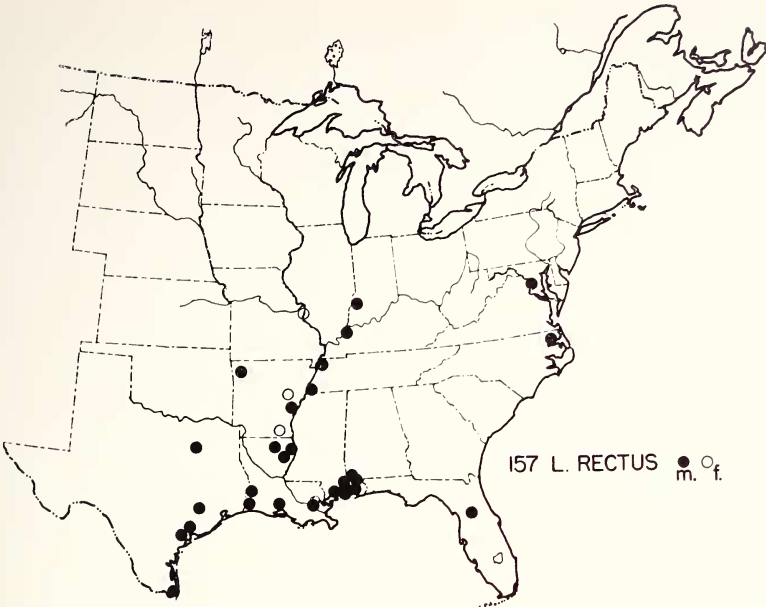
Figs. 15; 29 A, B; 82 A, B; 149

HOLOTYPE. ♂. Canal Zone, Barro Colorado Island. May, 1941. James Zetek, Collector, collected at black light. Lot No. 41-20602 (USNM). Paratypes. 2 ♂ 2 ♀ (USNM).

DESCRIPTION. *Color.* Dorsal: head, dark brown, labrum in female sometimes straw yellow; pronotum, disk dark brown, lateral margins light brown to straw yellow; elytra dark to light brown, a yellow spot near the humeri and towards the apex. Ventral: dark to reddish brown. Appendages: dark brown to yellow. *Head.* Clypeus: anterior margin straight. Epistomal and subgenal sutures: distinct,

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FIGS. 157–158. Geographical distribution maps. 157. *L. rectus* (Say). 158. *L. velocipes* Casey, *L. inferus* n. sp.



complete. Frontal sulci: moderately deep, broad, short. Microsculpture: clypeus, frons and vertex isodiametric. Mentum: apex of lobes narrowly rounded; tooth distinct, rounded at apex; furrows shallow, broad; fovae present or absent; if present, small and puncture-like; microsculpture elongate. *Thorax*. Pronotum: Microsculpture absent; lateral margins almost evenly rounded their entire length, not sinuate posteriorly, coarsely and densely punctate in the posterior half to three quarters; posterior angles distinct, acute; anterior marginal sulcus complete; posterior marginal sulcus reaching well past basal impressions, almost complete in some specimens; median sulcus distinct but not reaching anterior marginal sulcus or posterior margin; basal impressions deep, elongate, punctate; area between impressions punctate; area between impressions and lateral margins sparsely punctate. Scutellum: microsculpture isodiametric; apex pointed. N. B. Entire ventral surface without microsculpture. Prosternum: impunctate. Proepisternum: punctate. Proepimeron: impunctate. Mesosternum: impunctate. Mesepisternum: punctate in anterior quarter to half. Metasternum: punctate laterally. Metepisternum: punctate. Metepimeron: impunctate. *Legs*. Hind coxae: microsculpture on inner surface absent. Tarsi: segments 1–3 of middle and hind tarsi and 4 of hind tarsi grooved dorso-laterally. *Elytra*. Microsculpture on intervals absent; all striae distinct, punctate, trough 3–4 isodiametric units wide; internal plica well developed; humeri rounded; microsculpture of epipleura absent. *Abdominal sternites*. Microsculpture absent; segment 1 rugose and punctate along the basal margin and toward the lateral margin; segments 2–3 weakly rugose laterally. *Aedeagus*. Median lobe: not modified. Internal sac: everts medially, directed dorsally; no distinct scale groups present; most of the sac's surface covered with small weakly sclerotized scales; sclerotized ring absent. *Measurements*. (5 specimens). TL—7.0 (6.7–7.4); WH—1.4 (1.3–1.5); WP—2.2 (2.1–2.4); WW—3.2 (3.1–3.3).

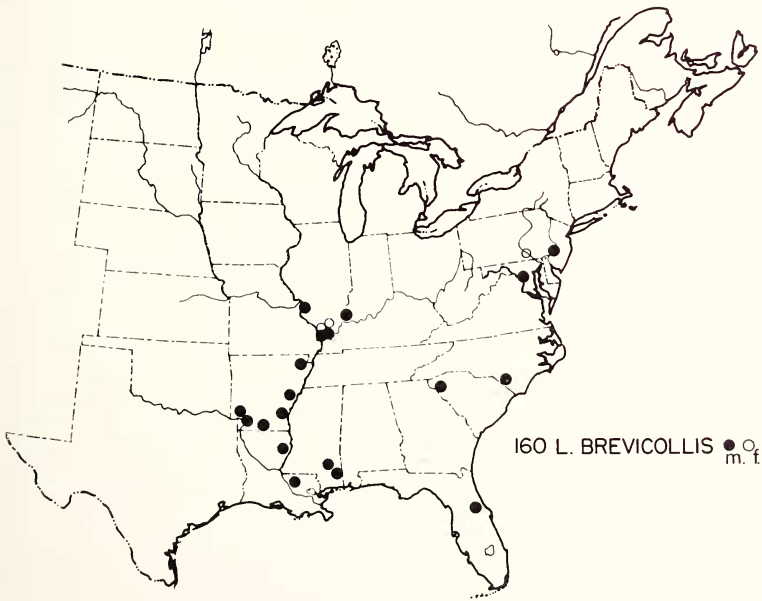
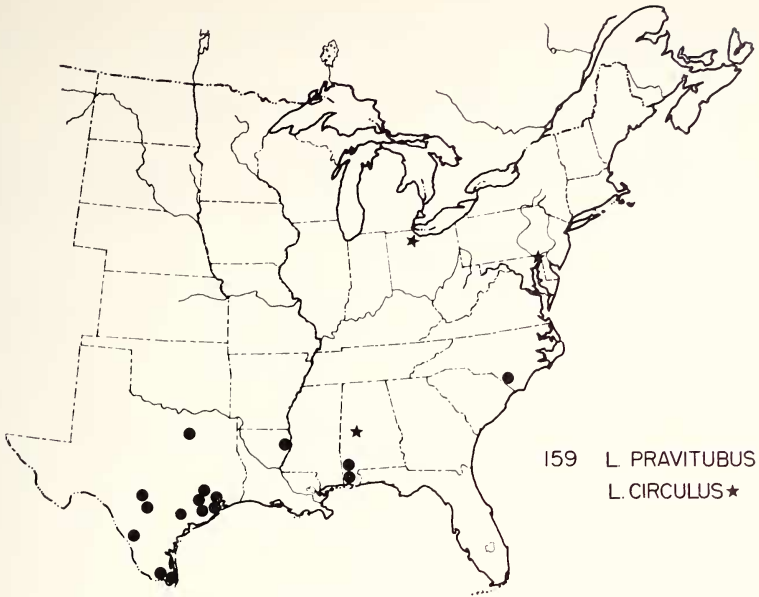
DISTRIBUTION. Central America.

LOCALITIES. CANAL ZONE. Barro Colorado Island (USNM).

DISCUSSION. *L. discolor* can be distinguished from *L. whiteheadi* by the more numerous and larger punctures along the lateral margins of the pronotum. The internal sac of the aedeagus is very similar to the internal sac of *L. whiteheadi*. However, the characters given in the key seem to be constant and serve to help distinguish these two species.

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FIGS. 159–160. Geographical distribution maps. 159. *L. pravitubus* n. sp., *L. circulus* n. sp. 160. *L. brevicollis* (LeC.).



L. discolor has been collected in April and May on Barro Colorado Island.

37. *Loxandrus saphyrinus* (Chaudoir)

Figs. 19 A, B, C; 22; 36 A, B; 106; 164

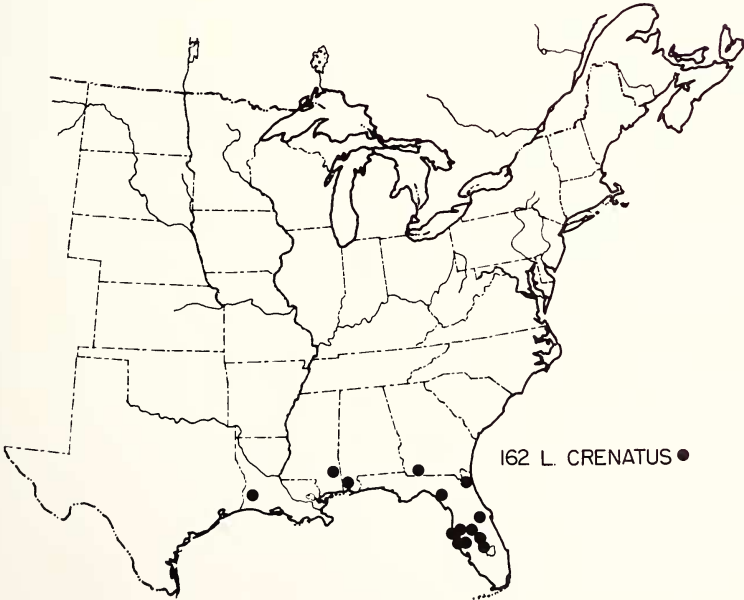
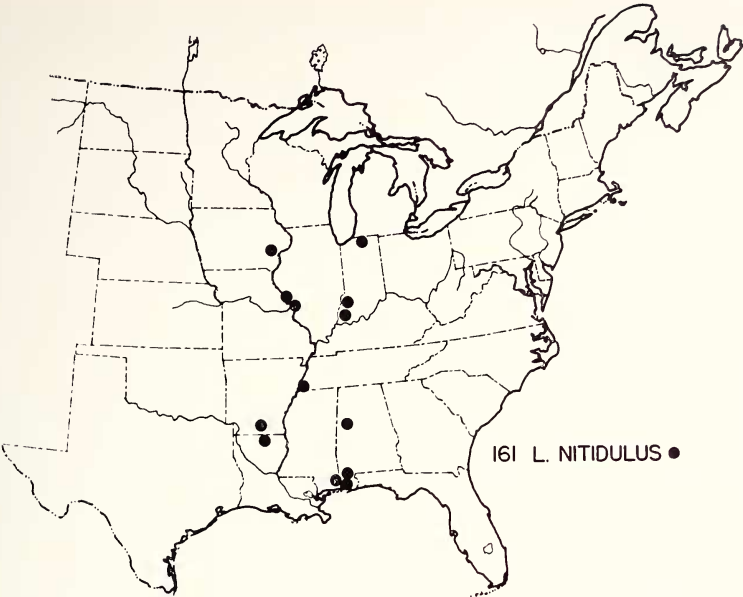
Megalostylus saphyrinus Chaudoir 1843:766. *Lectotype* (here designated).

♂. The first specimen in a series of 3 specimens is a male and is designated the lectotype. The other two specimens are female. Louisiana is listed as the locality on the determination label.

DESCRIPTION. *Color.* Entire body black, iridescent; appendages, dark to light brown, femora sometimes black. *Head.* Clypeus: anterior margin slightly concave. Epistomal and subgenal sutures: complete. Frontal sulci: abbreviated, broad, shallow. Microsculpture: clypeus, frons and vertex distinct, isodiametric. Mentum: apex of lobes pointed; tooth large, shorter than lobes, apex rounded; furrows obscure; fovae distinct; microsculpture obscure, elongate. *Thorax.* Pronotum: microsculpture absent on disk, present along lateral margins and in basal impressions; lateral margins narrowly reflexed in anterior two thirds, becoming broadly explanate in posterior third, punctate or not, evenly rounded, not sinuate posteriorly; posterior angles broadly rounded; anterior marginal sulcus incomplete; posterior marginal sulcus present, reaching to or only slightly past basal impressions; median sulcus present, not reaching anterior or posterior marginal sulci; basal impressions elongate, shallow but distinct, punctate or not; area between basal impressions usually punctate; area between basal impressions and lateral margin punctate or not. Scutellum: apex pointed; microsculpture mostly absent, sometimes vaguely present near apex, if so, elongate. Prosternum, Proepisternum, Proepimeron: impunctate; microsculpture absent. Mesosternum: impunctate; microsculpture elongate. Mesepisternum: punctate in the anterior three quarters; microsculpture vague, elongate. Metasternum: punctate toward lateral margins; microsculpture present only in sulci and punctures. Metepisternum: punctate; microsculpture present only in sulci and punctures. Metepimeron: impunctate; microsculpture absent. *Legs.* Hind coxae: microsculpture usually absent, if present, isodiametric; tarsal segments 1-3 of middle and hind tarsi (sometimes 4 of hind tarsi) grooved dorso-laterally. *Elytra.* Microsculpture absent; striae 6 and 7 not as distinct as 1-5, trough 4-5 isodiametric units wide; internal plica well-developed; humeri rounded;

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FIGS. 161-162. Geographical distribution maps. 161. *L. nitidulus* (LeC.). 162. *L. crenatus* LeC.



microsculpture of epipleura absent. *Abdominal sternites*. Microsculpture, where present, isodiametric; segments 1–4 rugose and punctate laterally, less so posteriorly. *Aedeagus*. Median lobe: not modified. Internal sac: everts medially, turned dorsally; one scale group on the right lateral side of the sac, posterior to the midline (sometimes reduced to a single scale); at least $\frac{1}{2}$ of the sac's surface covered with very small, weakly sclerotized scales, these sometimes becoming more distinct on the ventral surface at the base of the sac; sclerotized ring present. *Measurements*. (20 ♂♂ specimens). TL—11.6 (10.7–12.3); WH—2.5 (2.2–2.6); WP—3.8 (3.4–4.0); WW—4.6 (4.0–4.9).

DISTRIBUTION. Southeastern United States, west to Oklahoma and South-central Texas.

LOCALITIES. Alabama. Mobile Co.: Mobile (MCZ), Mt. Vernon (OSU); Randolph Co.: Wadley (USNM). *Chestong (OSU). Arkansas. Arkansas Co.: 5 mi. E. Dewitt (UA); Ashley Co.: 6 mi. W. Crossett (UA); Hempstead Co.: Hope (CAS); Washington Co.: 5 mi. S. Fayetteville (MSU). *Southwest Arkansas, unrecorded locality (AM). Florida. Charlotte Co.: Punta Gorda (CAS); Hendry Co.: LaBelle (KU); Hernando Co.: Brooksville (CAS, MCZ); Highlands Co.: Archbold Biological Station, Lake Placid (CU, PSU); Hillsborough Co.: Plant City (FSPB); Tampa (CU, MCZ, MSU, PU, USNM); Leon Co.: Lake Jackson (?), unrecorded locality (CU); Manatee Co.: Oneco (GB); Marion Co. (AM, CAS, CU); Orange Co.: Winter Park (MCZ); Osceola Co.: Kissimmee (USNM); Palm Co.: Canal Point (PU); Pinellas Co.: St. Petersburg (PU). Sarasota Co.: Sarasota (PU); Seminole Co.: Sanford (MCZ); Taylor Co.: Steinhatchee (USNM), Lake Okeechobee (PU). *Cedar Keys (USNM). *Oette (AM). *Ouecee (PU). Unrecorded locality in Florida (CAS, CNHM, CU, INHS, MCZ, OSU, USNM). Georgia. Thomas Co.: Thomasville (AM, USNM). Unrecorded locality (MCZ). Louisiana. East Baton Rouge Co.: Baton Rouge (MSU); Evangeline Co.: Lake Chicot State Park (TLE); Vernon Co.: Rosepine (UA). Unrecorded locality in Louisiana (AM, MCZ). Mississippi. Adams Co.: Natchez (CAS); Perry Co.: New Augusta (CU). *Lake View (CU). North Carolina. Johnston Co.: Clayton (NCSC); Hope Co.: Unrecorded locality (NCSC). South Carolina. Pickens Co.: Clemson (MSU). Tennessee. Unrecorded locality (UMIN). Texas. Brazos Co.: College Station (TAM); Calhoun Co.: Alligator Head (USNM); Colorado Co.: Columbus (MCZ, USNM), Skull Creek (UMIN).

DISCUSSION. *L. saphyrinus* is one of the larger *Loxandrus* species. It is very distinct and can readily be distinguished from other *Loxandrus* species by the characters given in the key. I have collected it in very wet habitats under leaf debris along the margins of streams. I have also taken it under leaf debris in relatively dry habitats and at

black light traps. It has been collected in all months of the year except October and November.

38. *Loxandrus lucens* Chaudoir

Figs. 37 A, B; 105; 163

Loxandrus lucens Chaudoir 1868:342. *Lectotype*, here selected. The second specimen in a series of 3. A male with a Texas locality label. The first specimen in the series is a male but has no data labels. The third specimen is a female from New Orleans and probably not part of the original type material. The type locality given by Chaudoir was Havre, Texas.

DESCRIPTION. *Color.* Dorsal: black, shining, elytra iridescent. Ventral: black to dark brown. Appendages: dark to reddish brown. *Head.* Clypeus: anterior margin slightly concave. Epistomal and subgenal sutures: obscure, weak. Frontal sulci: almost absent, broad, shallow. Microsculpture: clypeus, weak, isodiametric; frons and vertex, distinct, isodiametric. Mentum: apex of lobes rounded; tooth distinct, rounded at apex; furrows absent or ill-defined; foveae absent; microsculpture slightly elongate. *Thorax.* Pronotum: microsculpture on disk absent, present in the reflexed portion of the pronotum; lateral margins evenly rounded their entire length, not sinuate posteriorly; posterior angles broadly rounded; anterior marginal sulcus complete; posterior marginal sulcus reaching past the basal foveae but incomplete; median sulcus reaching anterior sulcus but not posterior margin; basal impressions elongate, moderately deep, punctate; area between impressions sparsely punctate; area between impressions and lateral margins usually impunctate. Scutellum: microsculpture elongate; apex pointed. Prosternum: microsculpture distinct laterally, elongate; impunctate. Proepisternum: microsculpture absent; punctures weak, shallow. Proepimeron: microsculpture elongate; impunctate. Mesosternum: microsculpture weak, elongate; impunctate. Mesepisternum: microsculpture usually absent; punctate in anterior half to three quarters. Metasternum: microsculpture distinct laterally, elongate; punctate laterally. Metepisternum: microsculpture absent; punctate. Metepimeron: microsculpture absent; impunctate. *Legs.* Hind coxae: microsculpture on inner surface, if present, elongate. Tarsi: segments 1-3 of middle and hind tarsi and sometimes 4 of hind tarsi grooved dorso-laterally. *Elytra.* Microsculpture on intervals absent; striae 1-6 and 8 distinct, 7 less so, all striae punctate, trough 1-2 sometimes 3 isodiametric units wide; internal plica distinct; humeri rounded; microsculpture on epipleura absent. *Abdominal sternites.* Microsculpture isodiametric laterally, elongate medially; segment 1 punctate at base,

laterally; segments 1–4 rugose at the base, laterally. *Aedeagus*. Median lobe: not modified. Internal sac: everts to the left side; no distinct scale groups on the main body of the sac; most of the surface is covered with small weakly sclerotized scales; a secondary bulbous sac everts in the basal half of the main sac, apex with a distinct scale group; sclerotized ring present. *Measurements*. (7 specimens). TL—9.1 (8.5–9.7); WH—1.9 (1.8–2.1); WP—3.0 (2.7–3.2); WW—3.6 (3.3–3.9).

DISTRIBUTION. Southern United States.

LOCALITIES. Alabama. Mobile Co.: Calvert (CAS). *Tumblin Gap (USNM), Arkansas. Arkansas Co.: E. Rydell, Bayou Meto (UA); Prairie Co.: (KU). Kentucky. Henderson Co.: Henderson (CU). Louisiana. Franklin Co.: Chase (UA); Orleans Co.: New Orleans (CAS) (♀ only). Tennessee. Shelby Co.: Memphis (CAS). Unrecorded locality in Tennessee (UM). Texas. Calhoun Co.: Alligator Head (USNM) (♀ only). Dallas Co.: Dallas (GB, MSU) (♀ ♀ only).

DISCUSSION. This species closely resembles *L. uniformis* in most external characters. The shape of the lateral margin of the pronotum serves to distinguish *L. lucens* from *L. uniformis*. This is a rather weak character and one that is hard to distinguish by one who is not familiar with *Loxandrus*. A more reliable identification can be made by examining the aedeagii of the two species. *L. lucens* has been collected in February, March, May, July and August.

39. *Loxandrus uniformis* New Species

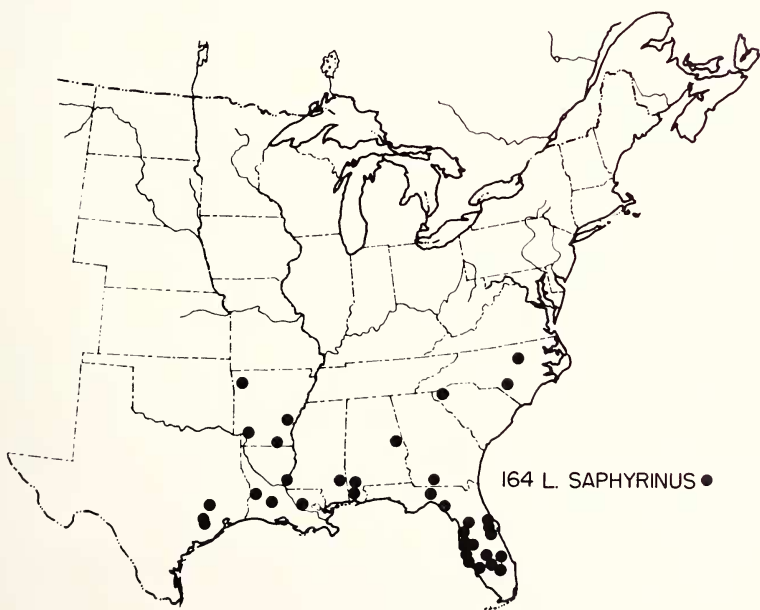
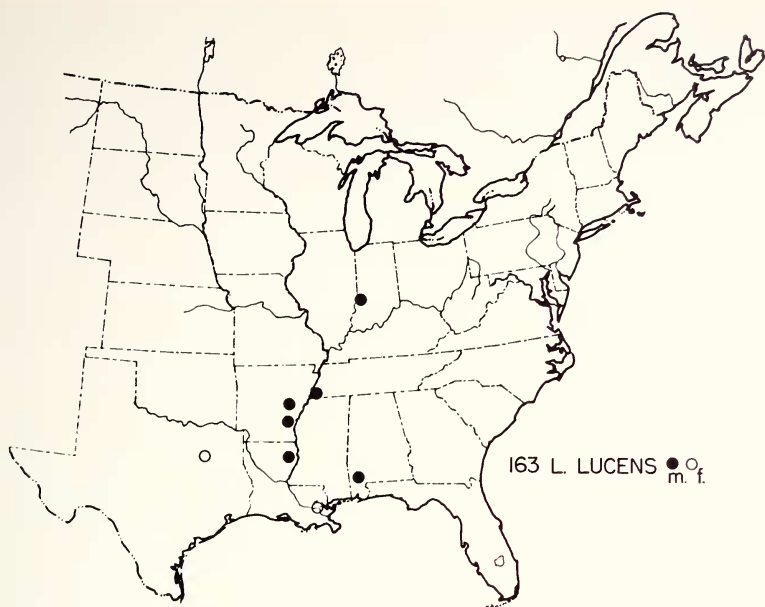
Figs. 38 A, B; 107; 165

HOLOTYPE. ♂. Alabama. Mobile, November 6, 1939. Van Dyke Collection (CAS). *Paratypes*. 5 ♂♂ 1 ♀ (CU); 1 ♂ (MCZ); 1 ♂ (GB); 1 ♂ (PU); 1 ♂ (INHS).

DESCRIPTION. *Color*. Dorsal: black or dark brown, shining, elytra iridescent. Ventral: black to dark brown, shining. Appendages: dark to light brown. *Head*. Clypeus: anterior margin slightly concave. Epistomal suture: weak but complete. Subgenal suture: present or absent. Frontal sulci: obscure, broad, shallow. Microsculpture: clypeus, frons and vertex weak, isodiametric. Mentum: apex of lobes rounded; tooth distinct, apex rounded; furrows absent or shallow; foveae absent; microsculpture slightly elongate. *Thorax*.

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FIGS. 163–164. Geographical distribution maps. 163. *L. lucens* Chaud. 164. *L. saphyrinus* (Chaud.).



Pronotum: microsculpture absent on disk, sometimes vaguely present along reflexed lateral margin; lateral margins more or less evenly rounded their entire length, not sinuate posteriorly; posterior angles narrowly rounded; anterior marginal sulcus usually incomplete; posterior marginal sulcus reaching to or slightly past basal impressions; median sulcus distinct but not reaching anterior or posterior marginal sulci; basal impressions moderately deep, elongate, punctate; area between basal impressions sparsely punctate; area between basal impressions and lateral margins usually impunctate. Scutellum: microsculpture isodiametric; apex pointed. Prosternum: microsculpture distinct toward lateral margin, elongate; impunctate. Proepisternum: microsculpture absent; punctate (sometimes weakly punctate). Propimeron: microsculpture absent; impunctate. Mesosternum: impunctate. Mesepisternum: microsculpture absent; anterior half punctate. Metasternum: microsculpture absent; punctate laterally. Metepisternum: microsculpture absent; punctate. Metepimeron: microsculpture absent; impunctate. *Legs.* Hind coxae: microsculpture on inner surface absent or very elongate. Tarsi: segments 1–3 of middle and hind tarsi and 4 of hind tarsi grooved dorso-laterally. *Elytra.* Microsculpture on intervals absent; all striae distinct punctate, trough 2–3 isodiametric units wide; internal plica well developed; humeri rounded; microsculpture of epipleura absent. *Abdominal sternites.* Microsculpture distinct, elongate laterally, becoming absent medially; segments 1–4 and sometimes 5 punctate and rugose laterally. *Aedeagus.* Median lobe: not modified. Internal sac: everts in a median position; four distinct scale groups present; most of the remainder of the sac's surface covered with small weakly sclerotized scales; sclerotized ring present. *Measurements.* (8 specimens). TL—9.5 (8.5–10.1); WH—1.8 (1.6–1.9); WP—2.9 (2.6–3.1); WW—3.7 (3.4–3.8).

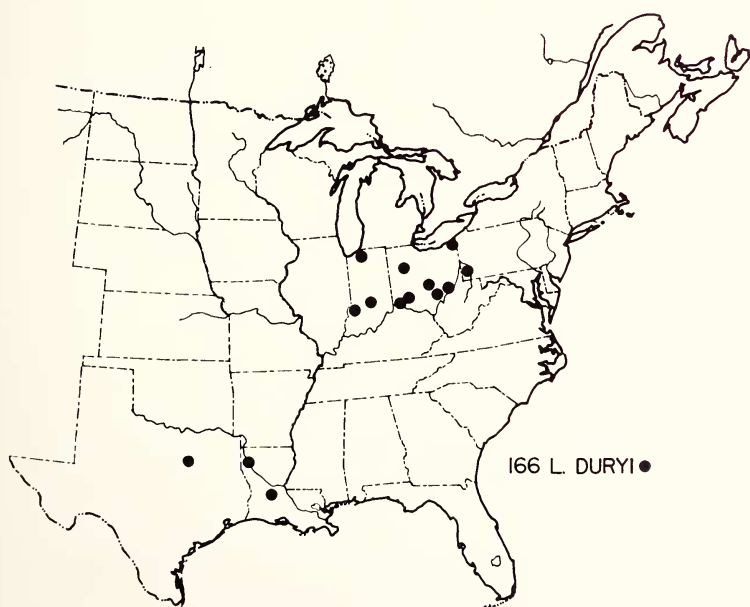
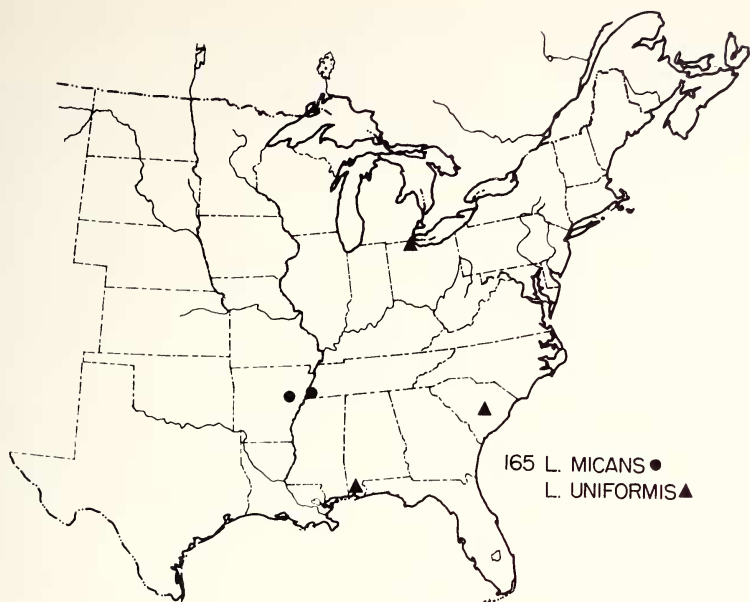
DISTRIBUTION. Eastern United States.

LOCALITIES. Alabama. Mobile Co.: Mobile (CAS, CU). Arkansas. Unrecorded locality (INHS). Ohio. Lucas Co. (PU). South Carolina. Sumpter Co.: Sumpter (GB). Virginia. Unrecorded locality (MCZ).

DISCUSSION. See discussion of *L. lucens*. *L. uniformis* has been collected in November and March.

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FIGS. 165–166. Geographical distribution maps. 165. *L. micans* Chaud., *L. uniformis* n. sp. 166. *L. duryi* Wright.



40. *Loxandrus minutus* New Species

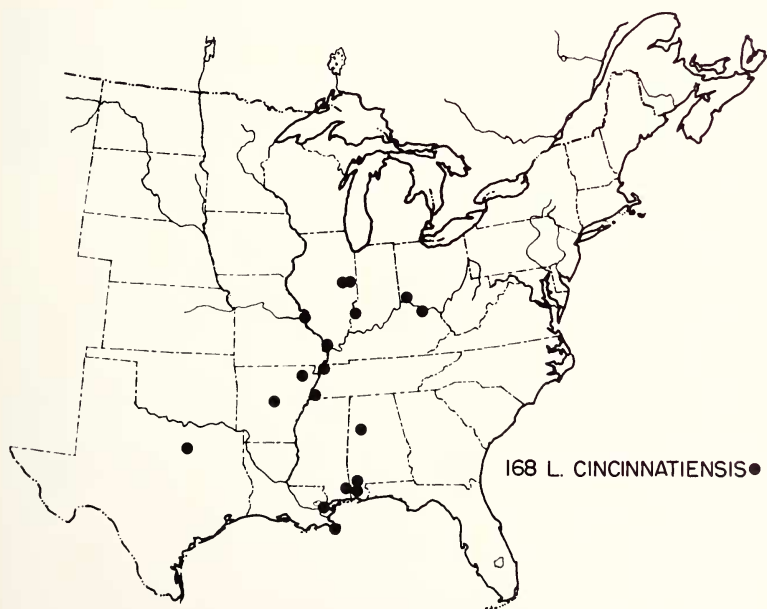
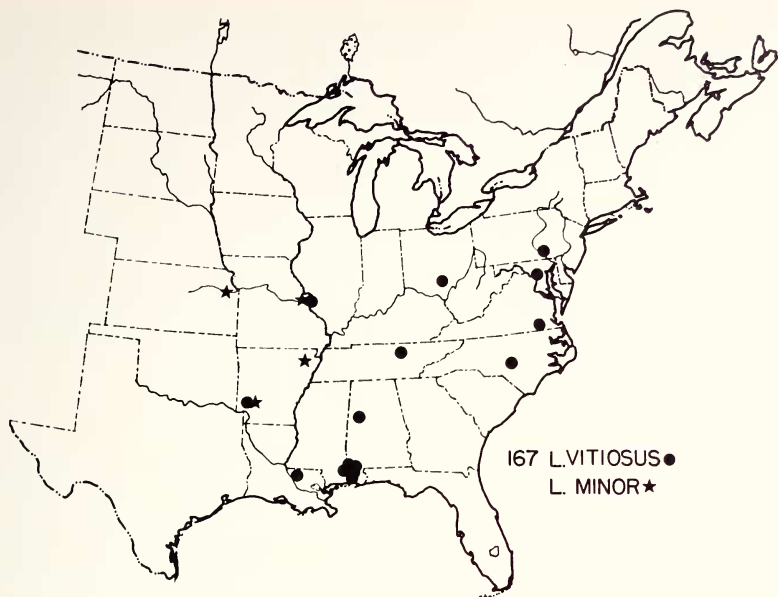
Figs. 65 A, B; 128; 129 A, B, C; 175

HOLOTYPE. ♂. Florida. Sarasota Co., Myakka River State Park. March 24, 1954. George E. Ball (MCZ). Paratypes. 37 ♂♂ 33 ♀♀ (GB); 1 ♂ 1 ♀ (UA); 3 ♂♂ (MCZ); 1 ♂ (USNM); 2 ♂♂ (CU); 4 ♂♂ (FSPB); 1 ♂ (UM); 1 ♂ (OSU); 4 ♂♂ (CAS); 2 ♂♂ (PU).

DESCRIPTION. *Color*. Dorsal: black, shining. Ventral: usually wholly black, sometimes dark brown. Appendages: black to dark brown. *Head*. Clypeus: anterior margin straight or slightly concave. Epistomal suture: obscure but usually present. Subgenal suture: present or absent. Frontal sulci: almost absent, obscure, broad, shallow. Microsculpture: clypeus, frons and vertex, isodiametric. Mentum: apex of lobes narrowly rounded; tooth distinct, shorter than lobes; furrows obscure, shallow; fovae absent; microsculpture isodiametric or slightly elongate. *Thorax*. Pronotum: microsculpture present, elongate on the disk, isodiametric anteriorly, along the reflexed lateral margins and in the basal impressions; lateral margins sparsely punctate posteriorly, evenly curved their entire length, not sinuate posteriorly; posterior angles rounded; anterior marginal sulcus complete; posterior marginal sulcus usually incomplete (vaguely complete in a few specimens); median sulcus reaching anterior marginal sulcus or not, never reaching posterior margin; basal impressions moderately deep, elongate, punctate; area between basal impressions and lateral margins usually impunctate. Scutellum: apex pointed; microsculpture isodiametric. Prosternum: microsculpture elongate or absent medially, isodiametric along the lateral margins; impunctate. Proepisternum and Proepimeron: microsculpture mostly isodiametric, sometimes elongate laterally; impunctate. Mesosternum: microsculpture slightly elongate; impunctate. Mesepisternum: microsculpture isodiametric; sparsely punctate anteriorly. Metasternum: microsculpture elongate or absent medially, isodiametric towards the lateral margins; impunctate. Metepisternum: microsculpture isodiametric; impunctate. Metepimeron: microsculpture elongate or absent; impunctate. *Legs*. Hind coxae: microsculpture on inner surface elongate. Tarsal segments: 1-3 of middle and hind tarsi and 4 of hind tarsi grooved dorso-laterally. *Elytra*. Microsculpture absent on intervals; striae 7 not as distinct basally as 1-6; all striae punctate, trough 1-2 isodiametric units wide; internal plica well developed; humeri rounded; microsculpture of

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FIGS. 167-168. Geographical distribution maps. 167. *L. vitiosus* n. sp., *L. minor* (Chaud.). 168. *L. cincinnatiensis* Casey.



epipleura absent. *Abdominal sternites*. Microsculpture isodiametric laterally, elongate or absent medially; segment 1 sometimes punctate at the base; segments 1–3 rugose along the basal margin laterally; ambulatory setae sometimes present on second segment. *Aedeagus*. Median lobe: not modified. Internal sac: everts in a median position; seven distinct scale groups present; two small secondary sacs on the left side of the sac, everting near the sclerotized ring, both with a small group of scales at the apex. Most of the remainder of the sac's surface is covered with very small, weakly sclerotized scales; sclerotized ring present. *Measurements*. (20 specimens). TL—6.4 (6.0–6.9); WH—1.3 (1.2–1.4); WP—2.1 (1.9–2.2); WW—2.7 (2.6–2.9).

DISTRIBUTION. Southeastern United States.

LOCALITIES. Florida. Alachua Co.: Gainesville (FSPB); Hernando Co.: Brooksville (CAS); Highlands Co.: Highlands Hammock (FSPB); Hillsborough Co.: Tampa (MCZ, USNM); Manatee Co.: Oneco (GB); Marion Co.: Micanopy (CU); Pinellas Co.: Dunedin (PU, UM); Sarasota Co.: Myakka River State Park (CU, FSPB, GB), Sarasota (PU), unrecorded locality (CAS, MCZ). Unrecorded locality in Florida (OSU). Georgia. Pierce Co.: Little Satilla River, at junction with U.S. - 301 (GB).

DISCUSSION. The smaller size and more rounded posterior angles of the pronotum serve to distinguish *L. minutus* from other species with which it might be confused. Positive identification, however, should be based on an examination of the male aedeagus. It has been collected in the months of January, February, March, April, June, October and November.

41. *Loxandrus velocipes* Casey

Figs. 47; 99 A, B; 158

Loxandrus velocipes 1918:390. *Holotype*. ♂. District of Columbia. Type No. 47346 (USNM).

DESCRIPTION. This species resembles *L. inferus* in all external characters. The reader is referred to the description of *L. inferus*. The two species differ only in the presence of one additional scale group on the right lateral surface of the internal sac in *L. velocipes* which is absent in *L. inferus*. *Measurements*. (20 specimens). TL—9.8 (9.0–10.1); WH—1.9 (1.7–2.0); WP—3.0 (2.8–3.3); WW—3.9 (3.6–4.1).

DISTRIBUTION. Eastern United States.

LOCALITIES. Alabama. Mobile Co.: Calvert (CAS), Mobile (OSU), Mt. Vernon (CU); Tuscaloosa Co.: Tuscaloosa (GB). Arkansas. Arkansas Co.: White River National Wildlife Refuge, White River Chute (UA); Drew Co.: 5 mi. Northwest Dermott, 7 Devils Swamp (UA); Union Co.: Little Corne Bayou, Hy. 169 (UA). Southwest Arkansas, unrecorded locality (AM). Illinois. Alexander Co.: Cashe River Bottom (RTB); Champaign Co.: Brownfield Woods (3 mi. N. Champaign) (UA); Cook Co.: Palos Park (UM). *Kahokia (MCZ). *Horseshoe Lake (INHS). Indiana. Posey Co. (PU). Louisiana. Orleans Co.: New Orleans (MCZ). Unrecorded locality (UM). Minnesota. Houston Co. (UMIN). Missouri. Unrecorded locality (USNM). North Carolina. Robeson Co.: Lumberton (USNM). Tennessee. Shelby Co.: Memphis (UM). Virginia. Unrecorded locality (USNM).

DISCUSSION. See above and discussion of *L. inferus*.

42. *Loxandrus inferus* New Species

Fig. 158

HOLOTYPE. ♂. Virginia. Nelson Co., Rosslyn, March 30, 1925. C. E. White, Collector (MCZ). Paratypes. 6 ♂♂ (USNM); 2 ♂♂ (MCZ); 1 ♂ (CU); 1 ♂ (OXU); 1 ♂ (INHS); 1 ♂ (TLE); 1 ♂ (MSU); 1 ♂ (CAS).

DESCRIPTION. *Color*. Dorsal: black, shining, elytra iridescent. Ventral: black shining. Appendages: yellow to dark brown. *Head*. Clypeus: anterior margin straight or slightly concave. Epistomal and subgenal sutures: weak. Frontal sulci: shallow, short, obscure. Microsculpture: clypeus, frons and vertex, distinct, isodiametric. Mentum: apex of lobes narrowly rounded; tooth large, apex truncate; furrows present; foveae absent; microsculpture distinct, isodiametric or slightly elongate. *Thorax*. Pronotum: microsculpture (usually) distinct, elongate; lateral margins punctate along basal quarter, evenly rounded, not sinuate posteriorly; posterior angles subacute; anterior marginal sulcus complete; posterior marginal sulcus incomplete; median sulcus reaching anterior marginal sulcus but not posterior margin; basal impressions elongate, narrow, deep, punctate; area between basal impressions and between impressions and lateral margins punctate. Scutellum: microsculpture distinct, isodiametric; apex pointed. Prosternum: microsculpture isodiametric; impunctate. Proepisternum: microsculpture isodiametric; impunctate. Proepimeron: microsculpture isodiametric; impunctate. Mesosternum: microsculpture elongate; impunctate. Mesepisternum: microsculpture elongate; anterior half punctate. Metasternum: microsculpture elongate; punctate laterally. Metepisternum: microsculpture elongate; punctate. Metepimeron: microsculpture weak, elongate; impunctate.

Legs. Hind coxae: microsculpture on inner surface elongate. Tarsal segments 1–3 (and often 4) of middle and hind tarsi grooved dorso-laterally. Elytra. Microsculpture on intervals absent; all striae distinct, trough 3–4 isodiametric units wide; internal plica well developed; humeri rounded; microsculpture of epipleura absent. *Abdominal sternites.* Microsculpture isodiametric laterally, becoming elongate medially; segment 1 punctate along basal margin laterally; segments 1–4 usually rugose along basal margin laterally. *Aedeagus.* Median lobe: not modified. Internal sac: everts medially and is directed dorsally; 4 distinct scale groups are present; small weakly sclerotized scales cover most of remainder of the sac's surface; sclerotized ring present. *Measurements.* (15 specimens). TL—9.7 (9.1–10.1); WH—1.8 (1.7–1.9); WP—3.0 (2.7–3.2); WW—3.8 (3.6–4.0).

DISTRIBUTION. Eastern United States.

LOCALITIES. Alabama. Mobile Co.: Calvert (CAS), Mt. Vernon (CU, OSU). District of Columbia. Washington (USNM, INHS). Georgia. Unrecorded locality (MSU). Louisiana. Evangeline Co.: Lake Chicot State Park (TLE); Orleans Co.: New Orleans (MCZ). Maryland. St. Marys Co.: Pinsky Pt. (USNM). Virginia. Nelson Co.: Rosslyn (MCZ).

DISCUSSION. *L. inferus* and *L. velocipes* are two very closely related species. They appear to be alike in all external characters and can be separated only on the basis of characters associated with the male genitalia. *L. velocipes* has one scale group on the right lateral surface of the internal sac that is not found in *L. inferus*. The geographical ranges of the two species overlap. *L. inferus* has been collected in the months of March, May, June and July. *L. velocipes* has been collected in the months of January, March, April, May, June, July and October. I have collected the latter species under very wet leaf debris in Arkansas and at a black light trap in Illinois.

43. *Loxandrus remotus* New Species

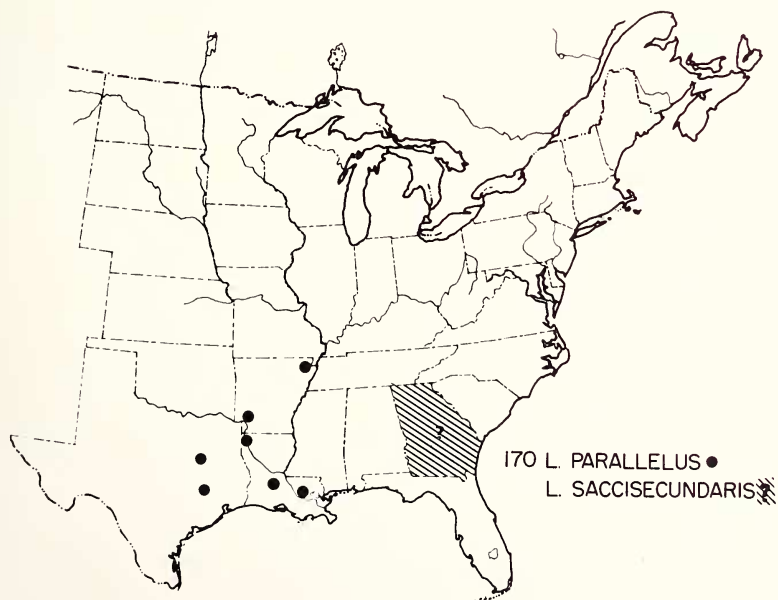
Figs. 5; 70 A, B; 77 A, B; 148

HOLOTYPE. ♂. Canal Zone, Paraiso. May 24, 1911. August Busck (USNM). Paratypes. 1 ♂ 1 ♀ (USNM).

DESCRIPTION. *Color.* Dorsal: usually black, sometimes dark brown, shining. Ventral: black to dark brown, shining. Appendages: black to dark brown to light yellow. *Head.* Clypeus: anterior margin slightly concave. Epistomal and subgenal sutures: distinct, complete.

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FIGS. 169–170. Geographical distribution maps. 169. *L. robustus* n. sp., *L. yeariani* n. sp. 170. *L. parallelus* Casey, *L. saccisecundaris* n. sp.



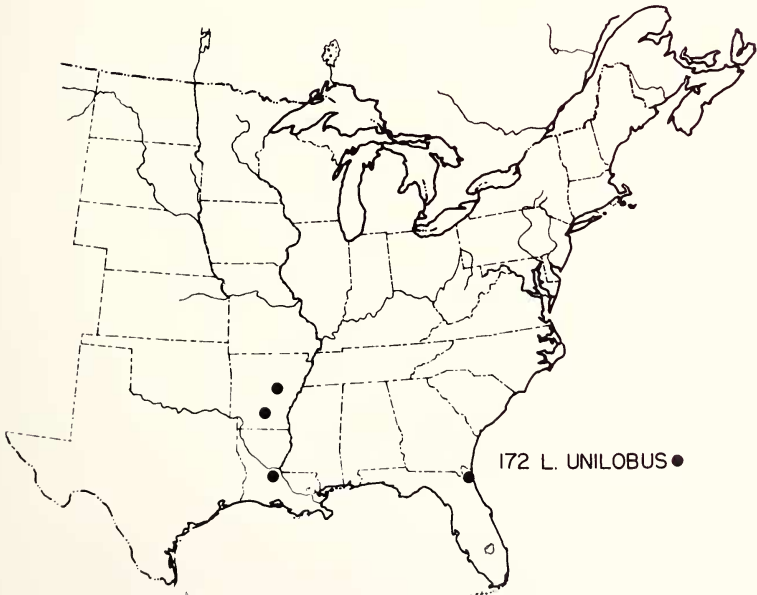
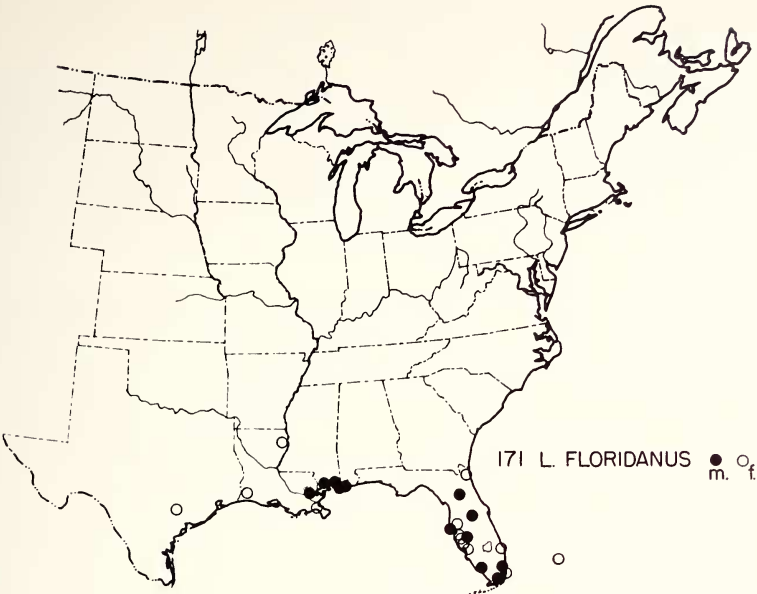
Frontal sulci: deep, broad, slightly diverging posteriorly. Microsculpture: clypeus, frons and vertex weak, isodiametric. Mentum: transverse; apex of lobes pointed; tooth distinct, apex obscurely indented, weak parallel carina on the tooth; furrows absent; fovae deep, distinct; microsculpture isodiametric and/or elongate. *Thorax*. Pronotum: microsculpture, elongate on disk, isodiametric along lateral margins and in basal impressions; entire surface impunctate; lateral margins feebly sinuate posteriorly; posterior angles acute; anterior marginal sulcus complete; posterior marginal sulcus absent; median sulcus almost reaching anterior marginal sulcus but not reaching posterior margin; basal impressions deep, elongate, continuous with a secondary posterior marginal sulcus, impunctate. Scutellum: microsculpture isodiametric; apex pointed. Prosternum and Proepisternum: microsculpture elongate if present; impunctate. Proepimeron: microsculpture isodiametric and/or elongate; impunctate. Mesosternum: microsculpture elongate; impunctate. Mesepisternum: microsculpture elongate if present; anterior half punctate. Metasternum: microsculpture absent; punctate laterally. Metepisternum: microsculpture absent; punctate. Metepimeron: microsculpture absent; impunctate. *Legs*. Hind coxae: microsculpture on inner surface absent. Tarsi: segments 1–3 of middle and hind tarsi grooved dorso-laterally. *Elytra*. Microsculpture on intervals absent; all striae distinct, punctate, trough 2–3 isodiametric units wide; internal plica well developed; humeri rounded; microsculpture on epipleura absent. *Abdominal sternites*. Microsculpture elongate if present; segments 1–6 punctate laterally; segments 1–5 rugose laterally. *Aedeagus*. Median lobe: not modified. Internal sac: everts in a median position; several distinct scale groups present; remainder of the sac's surface covered with small weakly sclerotized scales; a small secondary sac everting on both the right and left lateral surface at the base of the primary sac; sclerotized ring absent. *Measurements*. (3 specimens). TL—8.8 (8.5–9.2); WH—1.7 (1.7–1.8); WP—2.7 (2.6–2.7); WW—3.9 (3.7–4.0).

DISTRIBUTION. Central America.

LOCALITIES. CANAL ZONE. Corazal, La Chorrera, Paraiso (USNM).

DISCUSSION. This species is known from three specimens collected in the Canal Zone. The position of this species in the key does not indicate its true phylogenetic relationships. The reader is referred to the section on phylogeny for a further discussion. It has been collected in the months of April and May.

FIGS. 171–172. Geographical distribution maps. 171. *L. floridanus* LeC. 172. *L. unilobus* n. sp. →



44. *Loxandrus brevicollis* (LeConte)

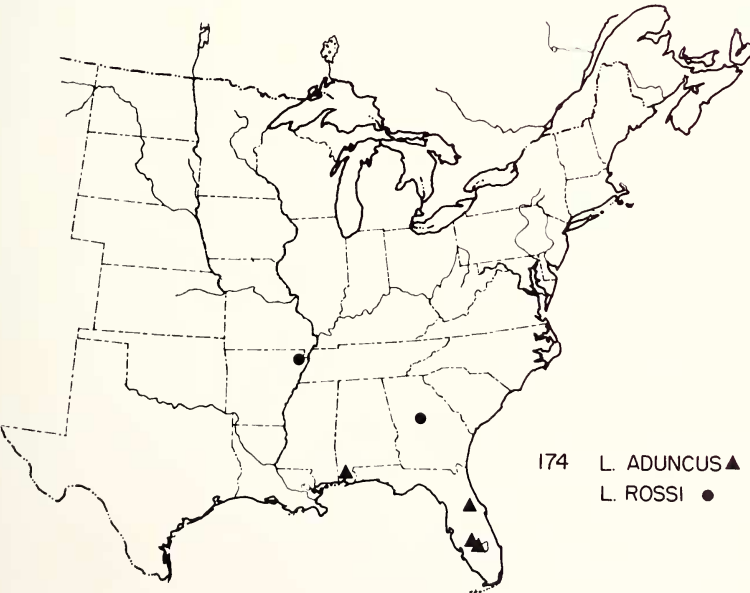
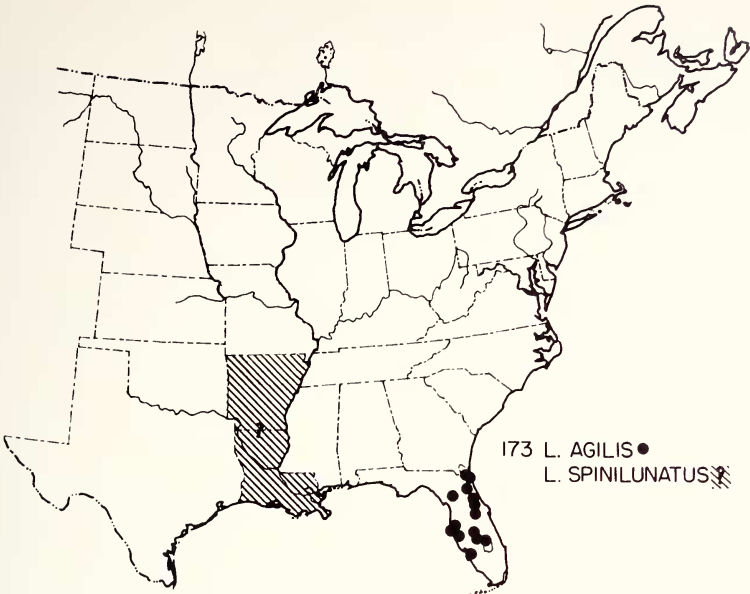
Figs. 14; 18 A, B; 48; 101 A, B, C, D; 160

Argutor brevicollis LeConte 1848:338. *Holotype*. ♀. Type No. 5695. (MCZ). There are three specimens in the type series. The first and second specimens are female and the third specimen is a male. None of the specimens have data labels and LeConte did not give a specific locality in the original description. I am here selecting Enterprise, Florida, as the type locality. See my discussion concerning types for my reasons for considering this a valid species.

DESCRIPTION. *Color.* Dorsal and ventral: black, shining. Appendages: dark brown to reddish brown. *Head.* Clypeus: anterior margin slightly concave. Epistomal suture: distinct, complete. Subgenal suture: obscure but complete. Frontal sulci: almost absent, shallow, broad. Microsculpture: clypeus, frons and vertex isodiametric. Mentum: lobes narrowly rounded; tooth large, distinct; furrows shallow; foveae faintly present (in some specimens); microsculpture isodiametric or elongate. *Thorax.* Pronotum: microsculpture absent on disk, present along the lateral margins; lateral margins rounded in the anterior half becoming somewhat parallel posteriorly, appearing sinuate in some specimens; posterior angles acute; anterior marginal sulcus complete; posterior marginal sulcus reaching to basal impressions, incomplete; median sulcus reaching anterior marginal sulcus but not posterior margin; basal impressions elongate, moderately deep, punctate; area between basal impressions punctate; area between basal impressions and lateral margins punctate or not. Scutellum: microsculpture isodiametric; apex pointed. Prosternum: microsculpture elongate medially, isodiametric laterally. Proepisternum: microsculpture elongate; punctate or not. Proepimeron: microsculpture elongate; impunctate. Mesosternum: microsculpture elongate; impunctate. Mesepisternum: microsculpture absent; anterior three quarters punctate. Metasternum: microsculpture elongate if present; punctate laterally. Metepisternum: microsculpture absent; punctate. Metepimeron: microsculpture absent; impunctate. *Legs.* Hind coxae: microsculpture on inner surface elongate if present. Tarsi: segments 1–3 of middle and hind tarsi and 4 of hind tarsi grooved dorso-laterally. *Elytra.* Microsculpture on intervals absent; all striae distinct, punctate,

→

FIGS. 173–174. Geographical distribution maps. 173. *L. agilis* (Dej.), *L. spinilunatus* n. sp. 174. *L. aduncus* n. sp., *L. rossi* n. sp.



trough 1–2 isodiametric units wide; internal plica distinct; humeri rounded; microsculpture of epipleura absent. *Abdominal sternites*. Microsculpture elongate medially on segments 2–6 and along the posterior margin of segments 3–6, isodiametric on other areas of the sternites; segment 1 sometimes punctate basally; segments 1–4 weakly rugose laterally. *Aedeagus*. Median lobe: not modified. Internal sac; everts medially and slightly directed dorsally; six distinct scale groups in the basal half of the sac; most of the sac's surface in the basal half covered with very small weakly sclerotized scales, apical half more or less free of these small scales; a secondary sac everts on the left lateral surface; sclerotized ring present. *Measurements*. (20 specimens). TL—10.6 (9.8–11.5); WH—2.0 (1.8–2.2); WP—3.4 (3.2–3.6); WW—4.3 (4.0–4.6).

DISTRIBUTION. Eastern United States. Gulf of Mexico north to Illinois and Pennsylvania.

LOCALITIES. Alabama. *Tumblin Gap (USNM). Arkansas. Arkansas Co.: White River National Wildlife Refuge (UA); Drew Co.: 3 mi. NW. Dermott, 7 Devils Swamp (UA); Greene Co.: Paragould (MSU); Howard Co.: 4 mi. W. Mineral Springs, Rte. 27 (UA); Lafayette Co.: Battle Lake, 7 mi. SW. Lewisville (UA); Union Co.: Little Corne Bayou, Hy. 169 (UA). Unrecorded locality in Arkansas (INHS). District of Columbia. Washington (INHS). Florida. Volusia Co.: Enterprise (USNM). Georgia. Unrecorded localities (MSU, USNM). Illinois. Jackson Co.: Carbondale (USNM); Johnson Co.: Goreville (MSU); Union Co.: Alto Pass (CNHM). Williamson Co.: Herrin (RTB). Indiana. Knox Co.: Unrecorded locality (PU). *Ent. Recon. Sta., Hovey Lake (PU). Louisiana. East Baton Rouge Co.: Baton Rouge (UA); Franklin Co.: Chase (UA). Massachusetts. Unrecorded locality (MCZ). Mississippi. George Co.: Lucedale (CU); Jones Co.: 4.2 mi. E. Laurel, Rte. 84. Bogue Home Creek (UA); Perry Co.: Richton (CU). Missouri. Butler Co.: Lake Wappapello, Poplar Bluff (CU); St. Louis Co.: St. Louis (UM). North Carolina. Robeson Co.: Lumberton (USNM). *Boardman (USNM). Oklahoma. Unrecorded locality (USNM). Pennsylvania. Daphin Co.: Harrisburg (MCZ); Delaware Co.: Essington (CAS). Unrecorded locality in Pennsylvania (MCZ, USNM). South Carolina. Anderson Co.: Clemson (MSU). Tennessee. Unrecorded locality (UMIN). State unknown (MCZ, RTB).

DISCUSSION. This is one of the larger and more distinct *Loxandrus* species. The males and females can usually be identified by using external characters. I have found it under wet leaf debris along the banks of streams and other bodies of water. It has also been collected at light traps. It has been collected in the months of February, March, April, May, June, July and August.

45. *Loxandrus erraticus* (Dejean)

Figs. 45; 95 A, B; 155

Feronia erratica Dejean 1828:24. *Holotype*. ♂. The first specimen in the second row of a series of 12 specimens. Bears the large green Dejean determination label, and a small green ♂ label (MNHP). Recorded from Boreal America. Other specimens in the series have locality labels from New Orleans (Louisiana?), and Cuba.

DESCRIPTION. *Color*. Dorsal: black, shining, elytra iridescent. Ventral: black, sometimes dark brown, shining. Appendages: usually dark to light brown, sometimes femora black. *Head*. Clypeus: anterior margin slightly concave. Epistomal and subgenal suture: complete. Frontal sulci: obscure, broad, shallow. Microsculpture: clypeus, frons and vertex distinct, isodiametric. Mentum: apex of lobes narrowly rounded; tooth distinct, apex broadly rounded; furrows present; fovae present or not; microsculpture isodiametric or slightly elongate. *Thorax*. Pronotum: microsculpture usually absent on disk, present along the reflexed lateral margins, isodiametric; lateral margins rounded in anterior half becoming somewhat parallel posteriorly, slightly sinuate near the basal angles, punctate posteriorly; posterior angles acute; anterior marginal sulcus complete or not; posterior marginal sulcus reaching to or slightly past basal impressions; median sulcus reaching anterior marginal sulcus but not posterior margin; basal impressions moderately deep, elongate, punctate; area between basal furrows and between furrows and lateral margin punctate. Scutellum: microsculpture isodiametric; apex pointed. Prosternum, proepisternum, propimeron: microsculpture elongate; impunctate. Mesosternum: microsculpture elongate; impunctate. Mesepisternum: microsculpture elongate if present; anterior three quarters punctate. Metasternum: microsculpture elongate where present; punctate laterally. Metepisternum: microsculpture elongate; punctate. Metepimeron: microsculpture absent; impunctate. *Legs*. Hind coxae: microsculpture on inner surface weak, elongate. Tarsi: segments 1–3 of middle and hind tarsi and 4 of hind tarsi grooved dorso-laterally. *Elytra*. Microsculpture on intervals absent; all striae distinct, punctate, trough 3–4 isodiametric units wide; internal plica well developed; humeri somewhat pointed; microsculpture on epipleura absent. *Abdominal sternites*. Microsculpture distinct, isodiametric laterally, becoming elongate medially; segment 1 punctate basally; segments 1–4 rugose along the basal margin laterally. *Aedeagus*. Median lobe: not modified. Internal sac: everts in a median position; two distinct scale groups present, one elongate group in the apical half on the right lateral surface, and one large scale group almost encircling the entire sac;

remainder of the sac's surface covered with small weakly sclerotized scales; sclerotized ring present. *Measurements*. (20 specimens). TL—9.8 (9.2–10.2); WH—1.9 (1.7–2.0); WP—3.0 (2.7–3.2); WW—3.9 (3.6–4.2).

DISTRIBUTION. Southeastern United States, north to Illinois.

LOCALITIES. Alabama. Mobile Co.: Calvert (CAS), Mobile (CU, MCZ, OSU), Mt. Vernon (CU); Tuscaloosa Co.: Tuscaloosa (GB). Arkansas. Arkansas Co.: 5 mi. E. Dewitt, Hy. 153 (UA); Greene Co.: Paragould (MSU); Hempstead Co.: Hope (MCZ); Howard Co.: 4 mi. W. Mineral Springs, Rte. 27 (UA). Jackson Co.: 5 mi. S. Newport (RTB); Prairie Co.: Rest Area, Hy. 40 at White River Bridge (UA); Pulaski Co.: Little Rock (MCZ). Unrecorded locality (INHS). Florida. Manatee Co.: Oneco (GB); Putnam Co.: Crescent City (USNM). Georgia. Thomas Co.: Thomasville (OSU). Illinois. Jackson Co.: Carbondale (INHS); Richland and Lawrence Co.: Wabash Valley (MCZ); Vermillion Co.: Oakwood (INHS). *Goreham (GB, MCZ). Kentucky. *Saborn (MCZ). Louisiana. Orleans Co.: New Orleans (USNM, UM); Plaquemines Co.: Myrtle Grove (INHS). Unrecorded locality in Louisiana (MCZ, UM, USNM). Mississippi. George Co.: Lucedale (CU); Jones Co.: 2 mi. E. Laurel, Rte. 84, Bogue Home Creek (UA); Perry Co.: Richton (CU). Missouri. Butler Co.: Lake Wappapello, Poplar Bluff (CU). New Jersey. Atlantic Co.: Atlantic City (MCZ); Burlington Co.: Riverton (OSU). North Carolina. *Boardman (USNM). *Lumberton (USNM). *Washington (MCZ). Pennsylvania. Delaware Co.: Essington (CAS). *Delfor (USNM). South Carolina. Unrecorded localities (MCZ). State unknown (AM, RTB, MCZ, USNM, UMIN).

DISCUSSION. This species is similar to *L. gibbus* in most external characters. Most of the specimens I have studied can be separated using the external characters presented in the key. The characters associated with the aedeagus are characteristic of the species. I have collected this species under leaf debris near the edge of streams and small pools of water. It has been collected in the months of March, May, June and December.

46. *Loxandrus gibbus* New Species

Figs. 6; 46; 96 A, B; 97; 156

HOLOTYPE. ♂. Alabama. Tuscaloosa, July 18, 1950. George E. Ball, Collector (MCZ). *Paratypes.* 5 ♂♂ (OSU); 3 ♂♂ (CAS); 1 ♂ (UA).

DESCRIPTION. *Color.* Dorsal: black, shining, elytra iridescent. Ventral: black to dark brown. Appendages: dark to reddish brown. *Head.* Clypeus: anterior margin slightly concave. Epistomal and

subgenal sutures: obscure, fine. Frontal sulci: almost absent, shallow, broad, short. Microsculpture: clypeus, frons and vertex isodiametric. Mentum: apex of lobes pointed; tooth distinct, rounded at apex; furrows and fovae absent; microsculpture elongate. *Thorax*. Pronotum: microsculpture on disk usually absent or very elongate if present, isodiametric along lateral margins; lateral margins rounded in anterior half, becoming oblique in posterior half, not sinuate, punctate in posterior quarter; posterior angles distinct, narrowly rounded; anterior marginal sulcus complete; posterior marginal sulcus reaching past basal impressions but incomplete; median sulcus reaching anterior marginal sulcus but not posterior margin; basal impressions moderately deep, elongate, punctate; area between impressions and between impressions and lateral margins punctate. Scutellum: microsculpture isodiametric; apex pointed. Prosternum: microsculpture elongate, more distinct laterally; impunctate. Proepisternum: microsculpture elongate; weakly punctate. Proepimeron: microsculpture elongate; impunctate. Mesosternum: microsculpture elongate; impunctate. Mesepisternum: microsculpture elongate; anterior three quarters punctate. Metasternum: microsculpture elongate where present; punctate laterally. Metepisternum: microsculpture very elongate; punctate. Metepimeron: microsculpture absent; impunctate. *Legs*. Hind coxae: microsculpture on inner surface absent. Tarsi: segments 1-3 of middle and hind tarsi and segment 4 of hind tarsi grooved dorso-laterally. *Elytra*. Microsculpture on intervals absent; all striae distinct, punctate, trough 2-3 isodiametric units wide; internal plica distinct; humeri rounded or weakly dentate; microsculpture of epipleura absent. *Abdominal sternites*. Microsculpture distinct, isodiametric laterally, elongate medially; segments 1-3 punctate along basal margin laterally; segments 1-4 weakly rugose laterally. *Aedeagus*. Median lobe: not modified. Internal sac: sac, when everted, directed to the left side; 6 distinct scale groups present; a secondary bulbous sac near the midline on the left lateral surface, a scale group on one surface; most of the remainder of the sac's surface covered with small weakly sclerotized scales; sclerotized ring present on the dorsal surface. *Measurements*. (10 specimens). TL—8.6 (8.2-9.2); WH—1.5 (1.5-1.6); WP—2.6 (2.5-2.7); WW—3.3 (3.2-3.5).

DISTRIBUTION. Southern United States north to Missouri.

LOCALITIES. Alabama. Mobile Co.: Calvert (CAS), Mt. Vernon (OSU), Mobile (OSU); Tuscaloosa Co.: Tuscaloosa (GB). *Salco (OSU). Arkansas. Ashley Co.: Hamburg (CNC); Hempstead Co.: Hope (CU); Union Co.: Little Corne Bayou, Hy. 169 (UA). Florida. Volusia Co.: Enterprise (USNM). Indiana. Virgo Co.: Unrecorded lo-

cality (PU). Louisiana. Franklin Co.: Chase (UA). Unrecorded locality in Louisiana (USNM). Missouri. St. Louis Co.: St. Louis (CAS). North Carolina. *Boardman (USNM). Tennessee. Unrecorded locality (USNM).

DISCUSSION. *Loxandrus gibbus* is most similar to *L. erraticus* in external appearances. It is usually smaller and positive identification can be made by examining the male genitalia. It has been collected in the months of February, March, May, July, August and September.

THE *L. nitidulus*, *L. robustus*, *L. cincinnatiensis*, *L. minor*,
AND *L. circulus* COMPLEX

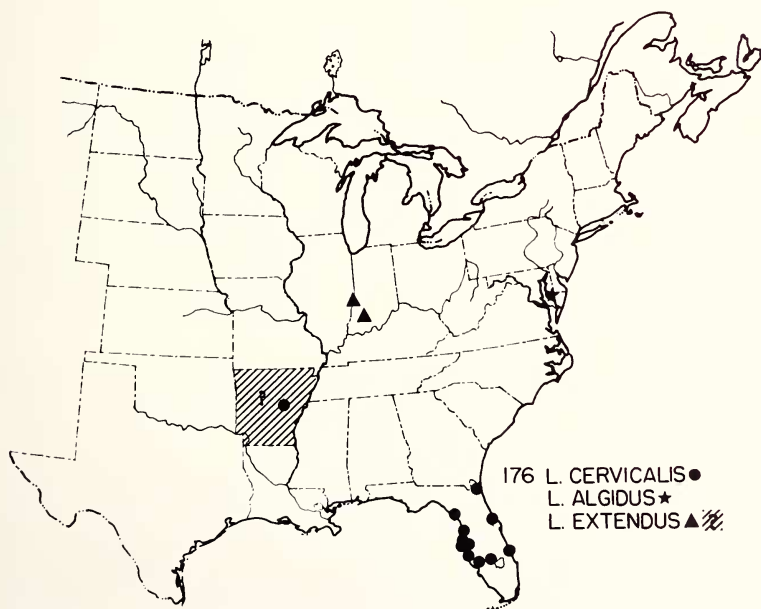
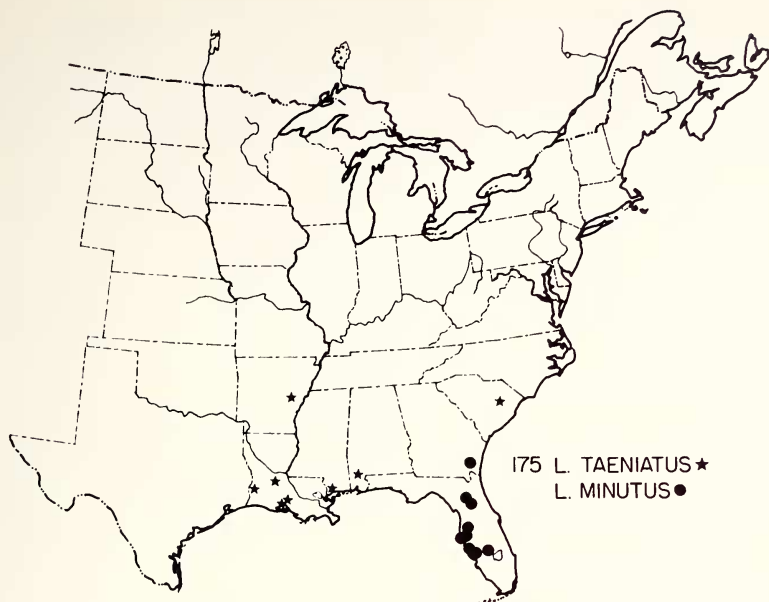
This group of medium size *Loxandrus* species closely resemble one another in external appearances and are closely related phylogenetically. They have in common all external characters, especially a more or less quadrate pronotum with distinct, narrowly rounded hind angles. The aedeagi of the five species are quite similar also.

Loxandrus nitidulus is presently known from more specimens and more localities than the other four species. The aedeagus of this species is most like *L. circulus* but has one less scale group on the internal sac. *L. nitidulus* has been collected in the months of March, April, May, June, July and October.

Loxandrus circulus is known from only eight specimens. Six of the specimens are from the Washington, D. C. area (1 marked Md., the remainder D. C.), one from Wood Co., Ohio, and one specimen was taken in Bibb County, Alabama. The Alabama specimen lacks a small scale group on the ventral surface of the IS of the aedeagus that lies between two large scale groups (Fig. 102 D, SA 1). It also has a strong scale group on the left dorso-lateral margin not present in three of the specimens from Washington (Fig. 102 A, SA 2). Three of the four Washington specimens have a small group of scales on the ventral surface of the sac of the aedeagus that lies between the two larger groups (Fig. 102 D, SA 1). One specimen from Washington appears to be intermediate between the one from Alabama and the three remaining Washington specimens by having the small group of ventral scales represented as several weakly sclerotized scales. The specimen from Wood Co., Ohio, has the ventral scale group SA 1 (Fig. 102 D) absent as well as a larger scale group SA 3 (Fig. 102 B)

→

FIGS. 175-176. Geographical distribution maps. 175. *L. taeniatus* LeC., *L. minutus* n. sp. 176. *L. cervicalis* Casey, *L. algidus* n. sp., *L. extendus* n. sp.



on the right lateral surface of the sac. However, the scale group SA 2 (Fig. 102 A) is distinct in the Wood Co. specimen. Because of the small number of specimens available and because of the seemingly intermediate condition of two specimens, I have chosen to call this group one species. Further collecting will no doubt resolve the problem.

Loxandrus minor and *L. cincinnatiensis* differ by only one scale group on the IS of the male aedeagus. *L. minor* is known from a number of localities in the central part of the United States. It has been collected in April. *L. cincinnatiensis* is known from a number of localities and appears to be confined to areas west of the Appalachian Mountains. It has been collected in the months of March, April, May, June and November.

Loxandrus robustus is known from several localities in Arkansas and from one locality in Indiana. The scale groups and their arrangement on the IS of the aedeagus of this species are very characteristic and cannot be confused with other species in this complex. This species has been collected in May, July and August. The Arkansas specimens were found under leaf debris.

47. *Loxandrus nitidulus* (LeConte)

Figs. 12; 49; 103 A, B, C; 161

Argutor nitidulus LeConte 1848:239. Holotype. ♀. Type number 5696. First specimen in a series of 4 specimens. Second specimen is a male. Specimens 3 and 4 are females (MCZ).

DESCRIPTION. *Color*. Dorsal: black, shining; elytra iridescent. Ventral: black, shining. Appendages: black to dark or reddish brown. *Head*. Clypeus: anterior margin slightly concave. Epistomal and subgenal sutures: finely produced, complete. Frontal sulci: obscure, broad, shallow, short. Microsculpture: clypeus, frons and vertex: isodiametric. Mentum: apex of lobes narrowly rounded;

→

FIGS. 177-178. Geographical distribution maps. 177. All known localities for all *Loxandrus* species in the Continental United States. Ad . . . Adirondak Mountains; Ap . . . Appalachian Mountains; Ar . . . Arbuckle Mountains; CA . . . Cincinnati Arch; CP . . . Cumberland Plateau; DA . . . Driftless Area; IO . . . Illinois Ozarks; NU . . . Northeastern Uplands; Ou . . . Ouachita Mountains; OP . . . Ozark Plateau; PP . . . Piedmont Plateau; WI . . . Wichita Mountains. After Ross, 1965. 178. All known localities for all *Loxandrus* species occurring in Middle America and the West Indies.

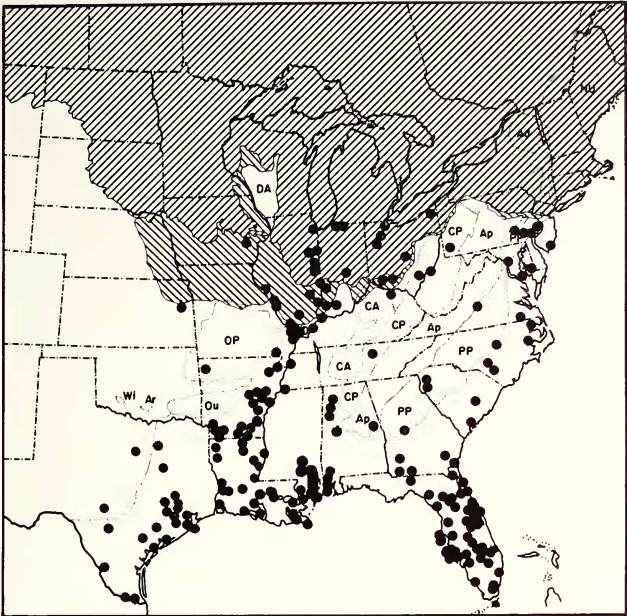


FIG. 177



FIG. 178

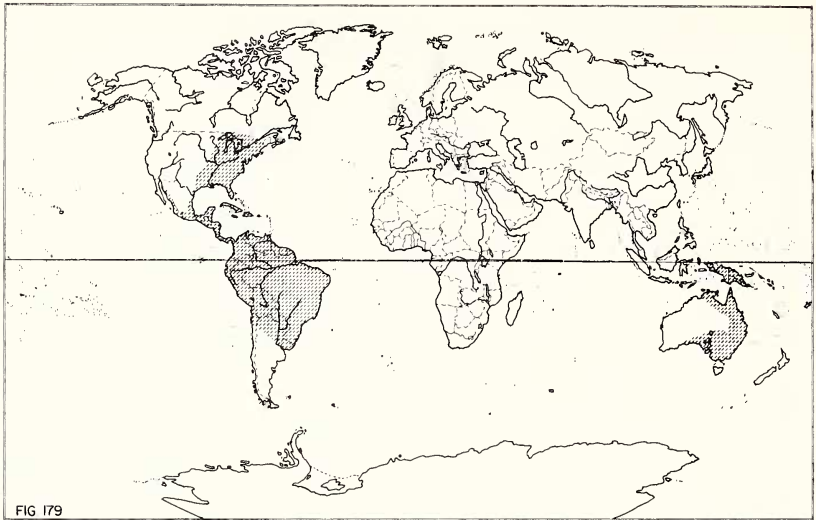


FIG. 179. Geographical distribution of the genus *Loxandrus* throughout the world.

tooth distinct, apex rounded; furrows present; fovae present or absent; microsculpture elongate. *Thorax*. Pronotum: microsculpture on disk absent, present along reflexed lateral margin, isodiametric; lateral margins evenly rounded, not sinuate posteriorly, sparsely punctate posteriorly; posterior angles subacute; anterior marginal sulcus complete; posterior marginal sulcus reaching slightly past basal furrows, incomplete; median sulcus reaching anterior sulcus but not posterior margin; basal impressions moderately deep, elongate, punctate; area between impressions punctate; area between impressions and lateral margins sparsely punctate. Scutellum: microsculpture isodiametric; apex pointed. Prosternum: microsculpture elongate; impunctate. Proepisternum: microsculpture elongate; punctate or not. Proepimeron: microsculpture elongate if present; impunctate. Mesosternum: microsculpture elongate; impunctate. Mesepisternum: microsculpture elongate; anterior three quarters punctate. Metasternum: microsculpture absent or obscure; punctate laterally. Metepimeron: microsculpture absent; impunctate. *Legs*. Hind coxae: microsculpture on inner surface absent. Tarsi: segments 1-3 of middle and hind tarsi and 4 of hind tarsi grooved dorso-laterally. *Elytra*. Microsculpture on intervals absent; all striae distinct, punctate, trough 2-3 isodiametric units wide; internal plica well developed;

humeri rounded; microsculpture on epipleura absent. *Abdominal sternites*. Microsculpture isodiametric laterally, becoming more elongate medially and on posterior segments and absent medially on segments 2–5; segments 1–3 sparsely punctate laterally; segments 1–5 weakly rugose laterally. *Aedeagus*. Median lobe: not modified. Internal sac: everts in a median position, directed dorsally; 6 distinct scale groups; a band of scales in the basal half completely encircling the sac; most of the remainder of the sac's surface covered with small weakly sclerotized scales; sclerotized ring present. *Measurements*. (20 specimens). TL—9.1 (7.6–10.4); WH—1.7 (1.4–2.0); WP—2.9 (2.3–3.3); WW—3.6 (3.0–4.1).

DISTRIBUTION. Eastern United States, south to the Gulf Coast, north to Illinois and Indiana, west to Iowa and Arkansas.

LOCALITIES. Alabama. Mobile Co.: Mobile (MCZ, OSU), Mt. Vernon (CU, OSU); Tuscaloosa Co.: Tuscaloosa (GB). Arkansas. Calhoun Co.: Bayou Moro, Hy. 160 (UA). Unrecorded locality in Arkansas (MCZ, INHS). Florida. Unrecorded locality (MCZ). Illinois. Calhoun Co.: Kampsville (USNM, MCZ). *Bureau (CAS). *Kahokia (MCZ). Unrecorded locality in Illinois (INHS, MCZ, MSU). Indiana. Elkhart Co.: Elkhart (CAS); Knox Co.: Unrecorded locality (CAS, PU); Vigo Co.: Unrecorded locality (CAS). Iowa. Johnson Co.: Iowa City (USNM). Unrecorded locality in Iowa (USNM). Louisiana. Union Co.: Farmerville (UA). Unrecorded locality in Louisiana (UM). Mississippi. George Co.: Lucedale (CU). Missouri. St. Louis Co.: St. Louis (INHS). Tennessee. Shelby Co.: Memphis (USNM).

DISCUSSION. See above.

48. *Loxandrus robustus* New Species

Figs. 53; 118 A, B; 169

HOLOTYPE. ♂. Arkansas. Lonoke Co., Carlisle; Liebeck Collection (MCZ). **Paratypes.** 2 ♂♂ (MCZ); 1 ♂ (UM); 1 ♂ (CU); 6 ♂♂ (UA); 1 ♂ (PU).

DESCRIPTION. *Color.* Dorsal: black, shining; elytra iridescent. Ventral: black or dark brown. Appendages: dark to reddish brown. *Head.* Clypeus: anterior margin slightly concave. Epistomal and subgenal sutures: distinct, complete. Frontal sulci: obscure, shallow, short. Microsculpture: clypeus, frons and vertex distinct, isodiametric. Mentum: apex of lobes pointed; tooth distinct, apex rounded; furrows shallow; foveae absent; microsculpture isodiametric and elongate. *Thorax.* Pronotum: microsculpture on disk absent or very weak, distinct and isodiametric along the reflexed lateral margin; lateral margin evenly rounded, not sinuate posteriorly, punctate posteriorly;

posterior angles narrowly rounded; anterior marginal sulcus complete; posterior marginal sulcus reaching past basal impressions but incomplete; median sulcus reaching anterior sulcus but not posterior margin; basal impressions moderately deep, elongate, punctate; area between impressions sparsely punctate; area between impressions and lateral margins sparsely punctate or not. Scutellum: microsculpture isodiametric; apex pointed. Prosternum: microsculpture isodiametric laterally, elongate medially. Proepisternum: microsculpture isodiametric; impunctate. Proepimeron: microsculpture elongate; impunctate. Mesosternum: microsculpture slightly elongate; impunctate. Mesepisternum: microsculpture elongate; anterior three quarters punctate. Metasternum: microsculpture elongate where present; punctate laterally. Metepisternum: microsculpture elongate; punctate. Metepimeron: microsculpture absent; impunctate. *Legs*. Hind coxae: microsculpture on inner surface weak, elongate. Tarsi: segments 1–3 of middle and hind tarsi and 4 of hind tarsi grooved dorso-laterally. *Elytra*. Microsculpture absent on intervals; all striae distinct, punctate, trough 2–3 isodiametric units wide; internal plica distinct; humeri rounded; microsculpture of epipleura isodiametric. *Abdominal sternites*. Microsculpture isodiametric laterally, elongate medially; segment 1 sparsely punctate laterally; segments 1–5 rugose laterally. *Aedeagus*. Median lobe: not modified. Internal sac: everts medially and is directed dorsally; 4 distinct scale groups present; most of remainder of the sac's surface covered with small weakly sclerotized scales; sclerotized ring present. *Measurements*. (5 specimens). TL—9.6 (9.4–9.8); WH—1.7 (1.7–1.8); WP—2.9 (2.8–3.0); WW—3.9 (3.8–4.0).

DISTRIBUTION. Southern United States.

LOCALITIES. Arkansas. Aransas Co.: White River National Wildlife Refuge, White River Chute Area (UA); Ashley Co.: 6 mi. W. Crossett (UA); Howard Co.: 4 mi. W. Mineral Springs, Rte. 27 (UA); Prairie Co.: Interstate 40 at White River Bridge (UA); Lonoke Co.: Carlisle (MCZ). Unknown localities in Arkansas (CU, MCZ). Indiana. Dubois Co.: Locality unknown (PU).

DISCUSSION. See above.

49. *Loxandrus cincinnatiensis* Casey

Figs. 52; 116; 168

Loxandrus cincinnatiensis Casey 1924:80. Holotype. ♂. Type No. 47355. (USNM). 1 female paratype.

DESCRIPTION. *Color*. Dorsal: black, shining; elytra iridescent. Ventral: black or dark brown. Appendages: legs black or dark

brown; palpi and antennae dark to light brown. *Head*. Clypeus: anterior margin straight. Epistomal suture: finely produced, complete. Subgenal suture: obscure or absent. Frontal sulci: obscure, broad, shallow. Microsculpture: clypeus, frons and vertex isodiametric, weak. Mentum: apex of lobes rounded: tooth distinct, apex rounded; furrows present, shallow; fovae distinct; microsculpture elongate. *Thorax*. Pronotum: microsculpture on the disk absent, isodiametric along the reflexed lateral margins; lateral margins evenly rounded, not sinuate posteriorly, sparsely punctate posteriorly; posterior angles narrowly rounded; anterior marginal sulcus complete; posterior marginal sulcus reaching past basal impressions but incomplete; median sulcus reaching anterior marginal sulcus or not, not reaching posterior margin; basal impression moderately deep, elongate, sparsely punctate; area between impressions sparsely punctate; area between impressions and lateral margins sparsely punctate or not. Scutellum: microsculpture isodiametric; apex pointed. Prosternum: microsculpture more distinct laterally, elongate; impunctate. Proepisternum: microsculpture elongate; obscurely punctate or not. Proepimeron: microsculpture elongate; impunctate. Mesosternum: microsculpture obscure, elongate; impunctate. Mesepisternum: microsculpture elongate; anterior three quarters punctate. Metasternum: microsculpture distinct laterally, elongate; punctate laterally. Metepisternum: microsculpture elongate; punctate. Metepimeron: microsculpture absent; impunctate. *Legs*. Hind coxae: microsculpture on inner surface absent. Tarsi: segments 1-3 of middle and hind tarsi and 4 of hind tarsi grooved dorso-laterally. *Elytra*. Microsculpture on intervals absent; all striae distinct, punctate, trough 3-4 isodiametric units wide; internal plica well developed; humeri rounded; microsculpture on epipleura absent. *Abdominal sternites*. Microsculpture isodiametric laterally, elongate or absent medially; segments 1 and 2 sparsely punctate laterally; segments 1-3 weakly rugose laterally. *Aedeagus*. Median lobe: not modified. Internal sac: everts towards the left, slightly directed ventrally; 5 distinct scale groups present; the right lateral surface is almost entirely covered by an ill-defined group of elongate scales; most of the remainder of the sac's surface covered by small, weakly sclerotized scales; sclerotized ring present. *Measurements*. (20 specimens). TL—9.2 (8.1-10.1); WH—1.7 (1.4-1.9); WP—2.9 (2.4-3.3); WW—3.7 (3.2-4.1).

DISTRIBUTION. Eastern United States from the Gulf of Mexico north to Illinois, Ohio west to Missouri, Arkansas and Texas.

LOCALITIES. Alabama. Mobile Co.: Mobile (OSU), Mobile or Mt. Vernon (MCZ); Tuscaloosa Co.: Tuscaloosa (GB). Arkansas. Jackson Co.: 5 mi. S. Newport (RTB); Pulaski Co.: Little Rock (MCZ). Illinois.

Alexander Co.: Cairo (CU); Champaign Co.: Urbana, Brownfield Woods (UA), Trelease Woods (RTB); Vermillion Co.: Kickapo State Park (RTB). Indiana. Knox Co.: Unrecorded locality (PU). Kentucky. Mason Co.: Maysville (CU). Louisiana. Orleans Co.: New Orleans (MCZ); Plaquemines Co.: Narin (USNM). Unknown localities in Louisiana (UM, USNM). Mississippi. George Co.: Lucedale (CU). Missouri. St. Louis Co.: St. Louis (MCZ). Ohio. Hamilton Co.: Cincinnati (MCZ, UM, OSU). South Carolina. Unrecorded locality (USNM). Tennessee. Lake Co.: Reelfoot Lake (RTB). Shelby Co.: Memphis (USNM). Unknown locality in Tennessee (UM). Texas. Dallas Co.: Dallas (MSU). No state and no locality (MCZ).

DISCUSSION. See above.

50. *Loxandrus minor* (Chaudoir)

Figs. 51; 115; 117; 167

Megalostylus minor Chaudoir 1843:766. Holotype. ♂. The first specimen in a series of two specimens is a male and bears a red type label. Louisiana is given as the type locality. The second specimen in the series is a female from Texas.

DESCRIPTION. *Color*. Dorsal: black, shining; elytra iridescent. Ventral: black to dark brown. Appendages: dark to light brown. *Head*. Clypeus: anterior margin slightly concave. Epistomal and subgenal sutures: distinct, complete. Frontal sulci: obscure, broad, shallow, short. Microsculpture: clypeus, frons and vertex, isodiametric; weak on the clypeus. Mentum: apex of lobes narrowly rounded; furrows absent; fovae deep, distinct; microsculpture elongate. *Thorax*. Pronotum: microsculpture on disk absent, distinct, isodiametric along reflexed lateral margins; lateral margin evenly rounded in anterior half, oblique in posterior half, not sinuate; posterior angles subacute; anterior marginal sulcus complete; posterior marginal sulcus reaching past basal impressions but incomplete; median sulcus reaching anterior sulcus but not posterior margin; basal impressions moderately deep, elongate, punctate; area between basal impressions and between impressions and lateral margins sparsely punctate. Scutellum: microsculpture isodiametric; apex pointed. Prosternum: microsculpture elongate, more distinct laterally; impunctate. Proepisternum: microsculpture isodiametric; punctures weakly present or not. Proepimeron: microsculpture elongate and isodiametric; impunctate. Mesosternum: microsculpture elongate or absent; anterior three quarters punctate. Metasternum: microsculpture elongate if present; punctate laterally. Metepisternum: microsculpture elongate; punctate. Metepimeron: microsculpture absent; impunctate. *Legs*. Hind coxae: microsculp-

ture on inner surface absent distally, obscurely present (elongate) proximally. Tarsi: segments 1–3 of middle and hind tarsi and 4 of hind tarsi grooved dorso-laterally. *Elytra*. Microsculpture on intervals absent; all striae distinct, punctate, trough 2–4 isodiametric units wide; internal plica distinct; humeri rounded; microsculpture of epipleura isodiametric. *Abdominal sternites*. Microsculpture distinct, isodiametric laterally, elongate medially; segments 1–3 obscurely punctate laterally; segments 1–4 rugose laterally. *Aedeagus*. Median lobe: not modified. Internal sac: everts medially and is slightly turned to the left side; 6 distinct scale groups present; most of the remainder of the sac's surface covered with small weakly sclerotized scales; sclerotized ring present. *Measurements*. (2 specimens). TL—9.0 (8.4–9.6); WH—1.7 (1.6–1.7); WP—2.9 (2.8–3.0); WW—3.7 (3.6–3.7).

DISTRIBUTION. Southern United States.

LOCALITIES. Arkansas. Jackson Co.: 5 mi. S. Newport (RTB); Hempstead Co.: Hope (MCZ). Illinois. Alexander Co.: Cairo (CU). Kansas. Douglas Co.: Lawrence (CAS). Louisiana. Unknown locality (UM).

DISCUSSION. See above.

51. *Loxandrus circulus* New Species

Figs. 10; 50; 102 A, B, C, D, E; 159

HOLOTYPE. ♂. District of Columbia. Roland Hayward, Collector (MCZ). Paratypes. 1 ♂ (GB); 1 ♂ (USNM); 2 ♂♂ (INHS).

DESCRIPTION. *Color*. Dorsal: black, shining; elytra iridescent. Ventral: black, shining. Appendages: black to dark or reddish brown. *Head*. Clypeus: anterior slightly concave. Epistomal sulcus: distinct, complete. Subgenal suture: obscure, finely produced. Frontal sulci: obscure, broad, shallow, short. Microsculpture: clypeus, frons and vertex isodiametric. Mentum: apex of lobes rounded; furrows and foveae absent; microsculpture isodiametric. *Thorax*. Pronotum: microsculpture on disk usually absent, elongate if present; lateral margins evenly rounded, not sinuate posteriorly, sparsely punctate posteriorly; posterior angles subacute; anterior marginal sulcus complete; posterior marginal sulcus reaching to just past basal impressions; median sulcus reaching anterior marginal sulcus but not posterior margin; basal impressions moderately deep, elongate, punctate; area between impressions sparsely punctate; area between impressions and lateral margins impunctate. Scutellum: microsculpture isodiametric; apex pointed. Prosternum: microsculpture elongate medially, isodiametric laterally;

impunctate. Proepisternum: microsculpture elongate; punctate. Propimeron: microsculpture elongate; impunctate. Mesosternum: microsculpture elongate; impunctate. Mesepisternum: microsculpture absent; anterior three quarters punctate. Metasternum: microsculpture usually absent, elongate if present; punctate laterally. Metepisternum: microsculpture absent; punctate. Metepimeron: microsculpture absent; impunctate. *Legs*. Hind coxae: microsculpture on inner surface absent, elongate and/or isodiametric. Tarsi: segments 1–3 of middle and hind tarsi and 4 of hind tarsi grooved dorso-laterally. *Elytra*. Microsculpture on intervals absent; all striae distinct, punctate, trough 2–3 isodiametric units wide; internal plica well developed; humeri weakly dentate; microsculpture on epipleura absent. *Abdominal sternites*. Microsculpture distinct, isodiametric laterally, elongate medially; segments 1–3 punctate laterally; segments 1–6 rugose laterally. *Aedeagus*. Median lobe: not modified. Internal sac: everts medially, directed dorsally; 8 or 9 distinct scale groups present; most of the remainder of the sac is covered with small weakly sclerotized scales; sclerotized ring present; see discussion for comments on variation. *Measurements*. (5 specimens). TL—9.1 (8.8–9.9); WH—1.7 (1.7–1.9); WP—2.9 (2.8–3.3); WW—3.6 (3.4–4.0).

DISTRIBUTION. Eastern United States, Washington, D. C., south to Alabama.

LOCALITIES. Alabama. Bibb Co.: Unrecorded locality (GB). District of Columbia. Washington (CNC, INHS, MCZ, USNM). Maryland. Unrecorded locality (UM). Ohio. Wood Co.: Unrecorded locality (PU).

DISCUSSION. See above.

52. *Loxandrus velox* (Dejean)

Feronia velox Dejean 1828:245. *Lectotype*, here designated. The first specimen, a male, in a series of four specimens in the Dejean collection in the Paris Museum. The first specimen bears a small green label. LeConte is given as the collector. Three additional specimens, two females and one male, are in the series.

DESCRIPTION. *Color*. Dorsal and ventral: black. Legs: dark brown. Antennae: dark brown. Palpi: dark to light brown. *Head*. Clypeus: weakly concave. Epistomal and subgenal sutures: not visible. Frontal sulci: obscure, short, shallow. Mentum: apex of lobes rounded; tooth not visible; furrows and fovae absent. *Thorax*. Pronotum: microsculpture if present weak and elongate; lateral margins not visible; posterior angles rounded; anterior marginal sulcus complete; posterior marginal sulcus reaching past basal impressions but

not complete; median sulcus weak, reaching anterior marginal sulcus but not posterior margin; basal impressions moderately deep, elongate; entire pronotum impunctate. Ventral surface: impunctate; microsculpture mostly absent but where visible, elongate. Scutellum: apex acutely pointed. *Legs*. Hind coxae: microsculpture on inner surface appears to be absent. *Elytra*. Microsculpture on intervals absent; all striae, except base of 7, distinct, punctate; trough appears to be 1 isodiametric unit wide; internal plica distinct; humeri rounded. *Abdominal sternites*. Microsculpture not visible; segments 1-2 weakly rugose basally; impunctate. *Aedeagus*. Median lobe: apex indented. Internal sac: everts in a median position; 7 scale groups present; a secondary sac everts apically; sclerotized ring present on the dorsal surface. *Measurements*. None.

DISTRIBUTION. "Boreal America" (MNHP).

DISCUSSION. See above.

POSTULATED ANCESTRAL AND DERIVED STATES OF CHARACTERS IN THE GENUS *LOXANDRUS*

There are several basic tenets that must be followed in working out the phylogenetic relationships of a group of organisms. The following list is a brief summary of the more important tenets that should be followed. These tenets and the basic philosophy relating to them are discussed in greater detail by Ross (1937, 1956, 1959, 1965, 1967) and Hennig (1966).

(1) The derived and ancestral states of at least some characters are postulated after a study of taxa believed to be closely related to the taxon under consideration.

(2) Utilizing these characters a hypothetical ancestor is postulated for the group with which one is working.

(3) It must be assumed that derived states of characters which are found in the group of organisms under study came about through a logical and orderly progression from ancestral to derived.

(4) The various species of the group are compared with one another and those species sharing derived characters in common are tentatively assumed to have risen from a common ancestor.

(5) On a strictly logical basis, species are grouped into distinctive phylogenetic lines arising from a common ancestor only on the basis of shared characters.

(6) Derived characters must originate from ancestral characters and not the opposite.

(7) One must strive to account for all the derived conditions of the characters the least number of times.

As mentioned previously, in order to ascertain the ancestral and derived states of various characters in *Loxandrus* it was necessary to determine the state of the characters in closely related groups. The closely related groups utilized in this study are listed below. A detailed diagnosis of each group can be found in Allen, 1969.

Tribe AMARINI

Genus *Amara* Bonelli 1809

A. cupreolata Putz. 1866

A. impuncticollis Say 1823

Tribe AGONINI

Genus *Calathus* Bonelli 1809

C. (Calathus) opaculus LeC. 1854

Genus *Agonum* Bonelli 1809

A. (Circinalia) pallipes Casey 1920

A. (s. str.) decorus (Say) 1823

A. (s. str.) extensicollis (Say) 1823

A. (s. str.) punctiformis (Say) 1823

Tribe PTEROSTICHINI

Genus *Stomis* Schellenberg 1806

S. pumicatus Panzer 1796

Genus *Trigonognatha* Motschoulsky 1857

T. coracinus (Say) 1825

Genus *Abaris* Dejean 1831

A. aequinoctialis Chaudoir 1852

Genus *Oxycrepis* Reiche 1843

O. intercepta Chaudoir 1873

Genus *Piesmus* LeConte 1852

P. monedulus German 1824

Genus *Dyschromus* Chaudoir 1835

D. nitidipennis Putzeys 1846

Genus *Pterostichus* Bonelli 1809

P. (Cylandrocharis) rostrata (Newman) 1838

P. (Cylandrocharis) grandiceps (LeConte) 1848

P. (Holciophorus) lama Mentrès 1844

P. (Pherypes) tarsalis LeConte 1873

P. (Hypherpes) californicus (Dejean) 1828

P. (Hypherpes) congestus Menetres 1844

P. (Hypherpes) validus Dejean 1831

P. (Hypherpes) brunneus Dejean 1831

P. (Monoferonia) diligendus (Chaudoir) 1866

P. (Gastrellaris) honestus (Say) 1825

- P. (Poecilus) chalcites* Say 1823
P. (Poecilus) lucublandus Say
P. (Poecilus) occidentalis Dejean
P. (Poecilus) texanus LeConte 1863
P. (Bothiopterus) pennsylvanicus (LeConte) 1863
P. (Bothiopterus) adstrictus (Eschscholtz) 1823
P. (Bothiopterus) sp.
P. (Lophoglossus) sp.
P. (Euferonia) coracina Newman 1838
P. (Euferonia) sp.
P. (Refonia) moesta (Say) 1823
P. (Metamelanius) ebeninus Dejean 1828
P. (Melanius) caudicalis Say 1823
P. (Melanius) corvinus Dejean 1828
P. (Melanius) luctuosus Dejean 1828
P. (Dysidius) purpuratus LeConte 1852
P. (Dysidius) mutus Say 1823
P. (Argutor) sp.
P. (Abacidus) hamiltoni (Horn) 1880
P. (Abacidus) permundus (Say) 1834
P. (Abacidus) sculptilis (LeConte) 1852
P. (Gastrosticta) subacuta Casey 1918
P. (s. str.) herculaneus Mannerheim 1843
P. (s. str.) mandibularis Kirby 1850
P. (s. str.) adoxus Say 1825
P. (s. str.) stygicus Say 1823
P. (s. str.) relictus Newman 1838

Genus *Evarthrus* LeConte 1852

- E. sordalis* LeConte 1848
E. seximpressus LeConte 1848
E. nonnitens LeConte 1873
E. incisus LeConte 1873

Armed with the information concerning the state of characters in groups closely related to the genus *Loxandrus* and using the philosophical principles and basic tenets previously set forth it is now possible to postulate the ancestral and derived state of some characters found in *Loxandrus*.

The external surface of all areas and sclerites usually has a characteristic microsculpture in groups related to *Loxandrus*. This microsculpturing can be an isodiametric pattern (Figs. 11 A, B; 16 A, B, C; 20 A, B, C; 21) or an elongate pattern (Figs. 13; 14; 15; 17; 18 A, B; 19 A, B, C; 22), the latter consisting of short fine parallel lines. In either case it is distinct. The prosternum, proepisternum, proepimeron, mesepisternum, metasternum, metepisternum, and metepimeron usually have microsculpturing of the elongate type. This elongate type

that is distinct is considered the ancestral state for these sclerites in *Loxandrus*. If the microsculpture is isodiametric, reduced or absent in species of *Loxandrus* it is considered derived.

The head, mesosternum, pronotum, scutellum, and elytra usually have microsculpturing of the isodiametric type. This is considered the ancestral state for these morphological parts and an elongate microsculpture or the absence of microsculpturing is considered derived for these areas in *Loxandrus*.

The sclerites on the ventral surface of the thorax can be either punctate or impunctate. In the majority of the groups related to *Loxandrus* the following condition exists: (1) the prosternum, propisternum, proepimeron, mesosternum, mesepimeron, and metepimeron are impunctate (Figs. 20 A, B, C); (2) the mesepisternum (anterior $\frac{3}{4}$ to $\frac{1}{2}$), and the lateral area of the metasternum are punctate (Figs. 19 A, B, C). Therefore, in the first group of six sclerites, the impunctate state is considered ancestral and a punctate state is derived, and in the second group of two sclerites the punctate state is considered ancestral and an impunctate state derived in *Loxandrus*.

In most of the genera and subgenera examined the intercoxal process of the prosternum is not margined. The unmargined state of the intercoxal process is considered ancestral and the margined state is considered derived in *Loxandrus*.

The color of most of the species examined was entirely black or dark brown. When another color other than black or dark brown is encountered among the species of *Loxandrus* it is considered derived.

In most genera and subgenera closely related to *Loxandrus* the internal plica on the lateral, apical margin of each elytron is present and well developed. This state is considered ancestral. When the internal plica is reduced or absent among species of *Loxandrus* it is considered a derived state of the character.

The internal sac of the aedeagus of the males in the genera and subgenera closely related to *Loxandrus* has various structures present or absent, i.e. scales, scale groups, and/or sclerites. These various arrangements can be divided into the following five generalized divisions: (1) the surface of the membranous sac can be completely devoid of scales, scale groups and sclerites; (2) the surface of the membranous sac can have scales covering varying amounts of the surface but no distinct scale groups or sclerites (Fig. 82 A); (3) the surface of the membranous sac can be devoid of scale groups but have certain areas sclerotized (Fig. 94 A); (4) the surface of the membranous sac can be devoid of sclerotized areas but possess scale groups (Fig. 10); (5) the surface of the membranous sac can have a combination of sclerotized areas and scale groups (Fig. 10).

The information derived from the study of genera and subgenera closely related to *Loxandrus* indicates that the ancestral state of the internal sac of the aedeagus of male *Loxandrus* was a sac with scales present and sclerites absent. Whether or not the scales were in well defined groups is not clear.

In some species of *Loxandrus* there occurs a sclerotized ring, usually near the apex of the internal sac. I believe that this ring is associated with the gonopore because in some species I have been able to trace the ejaculatory duct to this ring and I believe it is connected to the ring (Fig. 10 – SR). I have not been able to find the gonopore in those species of *Loxandrus* without a sclerotized ring. Therefore I have some reservations as to what the true relationship of the sclerotized ring is to the ejaculatory duct, i.e. sclerotized gonopore or not. Among those groups I have studied the sclerotized ring is a unique, derived adaptation in *Loxandrus*.

In most of the genera and subgenera examined the tooth of the mentum is short and not as long as the lobes of the mentum. In some species of *Loxandrus* the lobes of the mentum are short and the tooth is as long as the lobes or almost as long as the lobes. This gives the mentum a transverse appearance (Figs. 138; 139; 140). This transverse state is considered the derived condition in *Loxandrus*.

In all of the groups studied ambulatory setae were absent on the second abdominal sternite. This is considered the ancestral condition. When ambulatory setae do occur on the second abdominal sternite it is considered a derived condition.

It should be noted here that *Loxandrus* species from other parts of the world have been included where material was available for study. These species have not been incorporated into the key nor has a description been provided. These species and others will be treated in subsequent papers. The following is a list of species represented in the phylogeny but not treated in the taxonomic section of this paper. Their general area of distribution is indicated.

- Loxandrus longiformis* Sloane 1898 Australia
- Loxandrus amplicolis* Sloane 1903 Australia
- Loxandrus subiridescens* M'Leay 1869 Australia
- Loxandrus australiensis* Sloane 1895 Australia
- Loxandrus rufilabris* Castlneau 1867 Australia
- Loxandrus atronitens* M'Leay 1869 Australia
- Loxandrus major* Darlington 1962 New Guinea
- Loxandrus medius* Darlington 1962 New Guinea
- Loxandrus latus* Darlington 1962 New Guinea
- Loxandrus subrectus* Darlington 1962 New Guinea
- Loxandrus negrei* Straneo 1964 South America
- Loxandrus tucumanus* Dejean 1831 South America
- Loxandrus dubius* Curtis 1839 South America

THE PHYLOGENETIC RELATIONSHIPS AMONG THE SPECIES OF *LOXANDRUS*

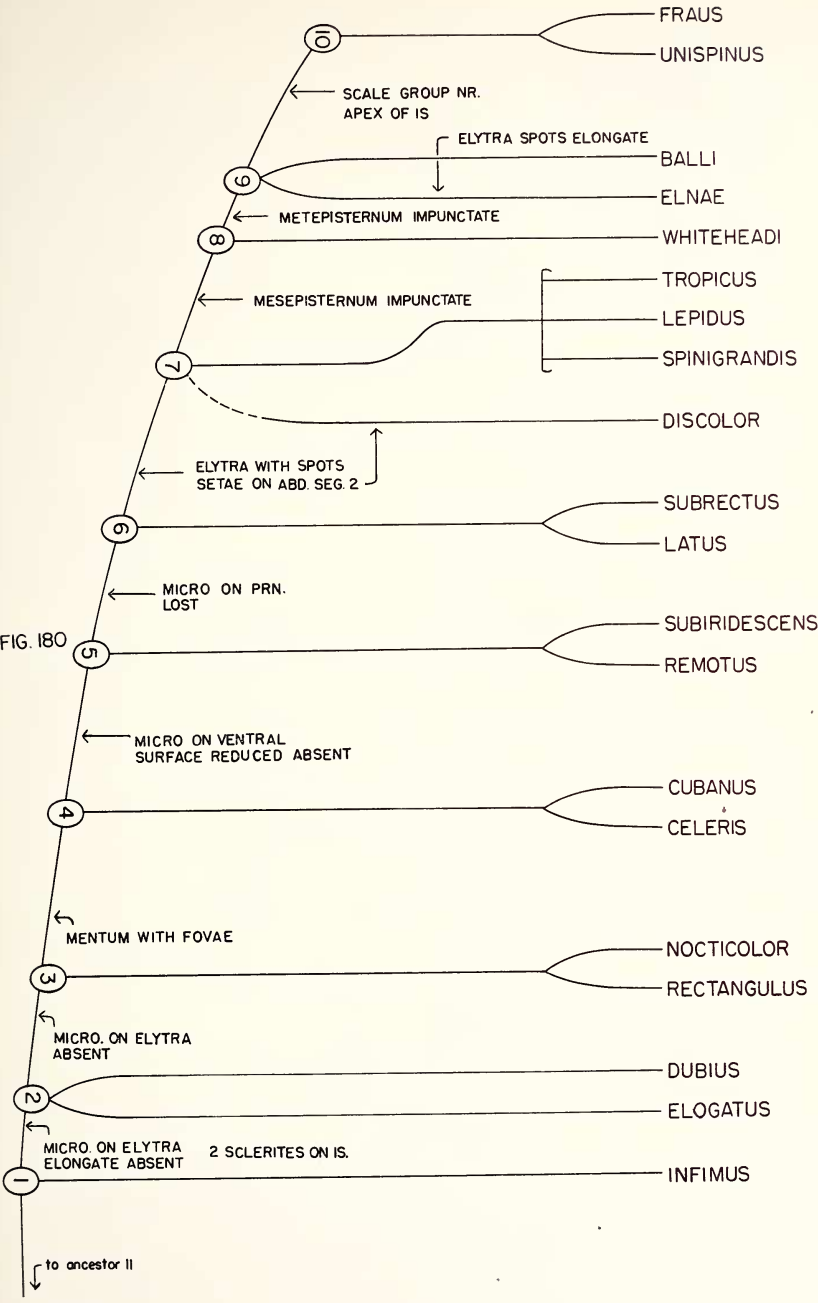
The following discussion annotates Figures 180, 181 and 182. Based on the information concerning the ancestral and derived states of various characters in the genus *Loxandrus* it is possible to postulate certain characteristics that the progenitor of this group probably possessed as follows. The microsculpture of prosternum, proepisternum, proepimeron, mesepisternum, metasternum, and metepimeron was distinct, fine, elongate parallel lines (Figs. 19 A, B, C). Microsculpture of head, mesosternum, pronotum, scutellum, and elytra was distinct, isodiametric (Figs. 16 A, B, C; 20 A, B, C). The prosternum, proepimeron, mesosternum, mesepimeron, and metepimeron were impunctate (Figs. 20 A, B, C). The mesepisternum (anterior $\frac{3}{4}$ to $\frac{1}{2}$) and the lateral areas of the metasternum were punctate (Figs. 19 A, B, C). The trough of the striae on the elytra were 1–2 isodiametric units wide (Figs. 11 A, B; 13). The intercoxal process of the prosternum was not margined. The mentum was not transverse and did not possess foveae. The second abdominal sternite lacked ambulatory setae. The color was a uniform black or dark brown. The internal sac of the aedeagus was devoid of sclerites and of a sclerotized ring toward the apex (Fig. 9). The sac probably possessed scales on the surface but there was only one defined scale group, if any. The internal plica near the apex of the elytra was present and well developed.

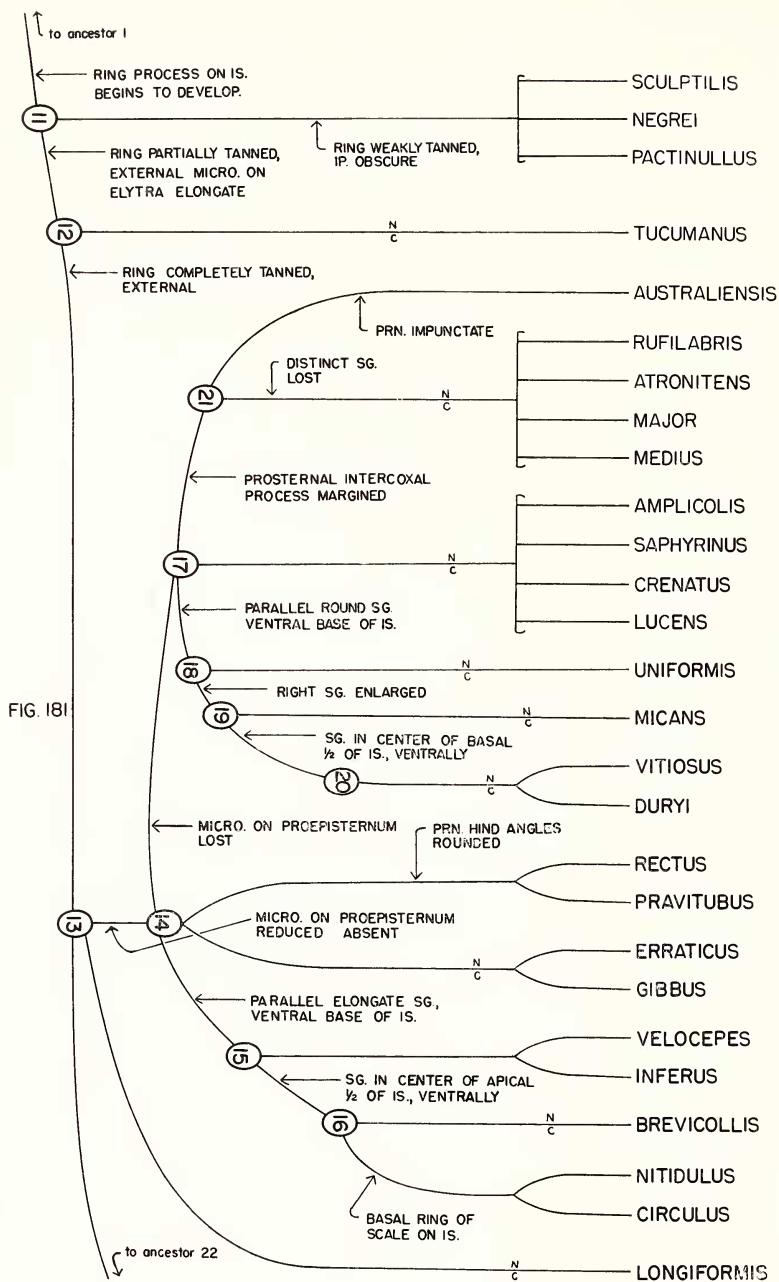
The progenitor of *Loxandrus* is represented by ancestor 1. Three lineages seem to have arisen from ancestor 1. *Loxandrus infimus*, one lineage arising from ancestor 1, appears to have changed little from the ancestor. The second lineage arising from ancestor 1 gave rise to ancestor 2 in which the microsculpture on the elytra became reduced to fine elongate lines or became altogether absent (Figs. 13, 14), a character which has apparently evolved twice in *Loxandrus* as we shall presently see. The third lineage arising from ancestor 1 gave rise to ancestor 11 in which a ring process near the apex of the internal sac of the aedeagus began to develop (Figs. 91 A; 93 A).

Ancestor 2 gave rise to three lineages. *Loxandrus elongatus* appears to have changed little from the ancestor. *Loxandrus dubius* is the end result of a second lineage arising from ancestor 2 in which two sclerites developed on the internal sac of the aedeagus (Figs. 73 B – S1, S2). The third lineage arising from ancestor 2 resulted in ancestor 3 in which the microsculpture on the elytra was entirely absent.

→

FIGS. 180–182. Hypothetical phylogeny of *Loxandrus* species. Three parts.





Loxandrus nocticolor and *Loxandrus rectangulus* are two existent species which appear to have changed little from ancestor 3. Ancestor 3 also gave rise to a lineage in which fovae on the mentum were developed (Figs. 138, 139, 140). Ancestor 4 is represented in our present day fauna by *Loxandrus celeris* and *Loxandrus cubanus*. These two species appear to have changed little from ancestor 4. Ancestor 4 also gave rise to a lineage in which the microsculpture on the surface of all ventral sclerites became greatly reduced if not absent and which resulted in ancestor 5.

Ancestor 5 is represented in our present day fauna by *Loxandrus subiridescens* and *Loxandrus remotus*. These two species appear to have changed little from ancestor 5. Ancestor 5 also gave rise to a lineage in which the microsculpture on the pronotum was lost and which resulted in ancestor 6.

Ancestor 6 is represented in our present day fauna by *Loxandrus subrectus* and *Loxandrus latus*. These two species appear to have changed little from ancestor 6. Ancestor 6 also gave rise to a lineage which resulted in ancestor 7 in which a unique character among *Loxandrus* appeared. The character was the development of orange or dark yellow spots on each elytron, one near the humeri and one towards the apex (Fig. 2 A).

Ancestor 7 gave rise to at least four and possibly five phylogenetic lineages. *Loxandrus spinigrandis*, *Loxandrus tropicus*, and *Loxandrus lepidus* are the end results of three of these lineages and appear to have changed little from the ancestor. *Loxandrus discolor*, a fourth lineage that may have arisen from ancestor 7, also possesses most of the external characters attributed to ancestor 7, but the internal sac of the male aedeagus (Fig. 82 A) is very similar to *Loxandrus whiteheadi* (Figs. 86 A, B). Occasional specimens of *Loxandrus discolor* also have ambulatory setae present on sternite 2 of the abdomen, a character which apparently arose one other time in a far-distantly related *Loxandrus* group. The phylogenetic position of *Loxandrus discolor* is thus questionable at this time. A fifth lineage arising from ancestor 7 in which the punctures on the mesepisternum were lost resulted in ancestor 8 (Fig. 20 B).

Ancestor 8 seems to have given rise to two evolutionary lines. *Loxandrus whiteheadi* is the end result of one of these lines and appears to have changed little from its ancestor. In the second line arising from ancestor 8 the punctures on the metepisternum (Fig. 20 A) were lost, resulting in ancestor 9.

Ancestor 9 appears to have given rise to 3 phylogenetic lineages. *Loxandrus balli*, one line arising from ancestor 9, is a species that seems to have changed little from the ancestor. *Loxandrus elnae* arose

from ancestor 9 and has one notable external character that is different from its hypothetical ancestor. In *Loxandrus elnae* the spots on each elytron have become elongate, thus forming lines near the lateral margins of the elytra. The internal sac of the aedeagus of *Loxandrus elnae* must also be mentioned (Figs. 90 A, B). It is quite similar to *Loxandrus floridanus* (Figs. 122 A, B), a distantly related species. This similarity is very striking but I feel that at the present time the evidence indicates that the common ancestry of *Loxandrus elnae* and *Loxandrus floridanus* is not very close. In the third line arising from ancestor 9 there developed a small group of scales near the apex of the internal sac that resulted in ancestor 10 (Figs. 87 A; 89).

Ancestor 10 gave rise to two lineages. One lineage resulted in *Loxandrus fraus* and the other lineage resulted in *Loxandrus unispinus*. These two species appear to have changed little from their ancestor.

Thus far, none of the species discussed have possessed a sclerotized ring near the apex of the internal sac. The third phylogenetic line arising from ancestor 1 resulted in a short series of species that illustrate what I believe to be the gradual development of this sclerotized ring. Hypothetical ancestor 11 and 3 species of our present day stock represent the first step in the development of the sclerotized ring.

Ancestor 11 gave rise to several phylogenetic lineages. In one lineage arising from ancestor 11 the ring on the internal sac of the aedeagus became larger and was weakly sclerotized but was not completely enclosed inside the sac of the aedeagus (Fig. 94 A – R1) and the microsculpture on the elytra became reduced or obscure, fine, parallel lines (Figs. 13, 14, 15). This lineage resulted in ancestor 12. The remaining lines that arose from ancestor 11 resulted in *Loxandrus pactinullus*, *Loxandrus negrei*, and *Loxandrus sculptilis*.

The ring on the internal sac of the aedeagus of males of the above three species is turned inward and covered by the membranous sac (Figs. 91 A; 93 A – R1). I have been unsuccessful in trying to force the ring to the surface without destroying the sac. The ring is weakly sclerotized if at all. It does have enough rigidity that when compressed with a pair of forceps it will return to its original shape. The median lobe and internal sac of the aedeagii of the males of the three species under discussion show no other distinctive morphological characters. The mentum in these three species is transverse. That is, the tooth is as long as or almost as long as the lobes of the mentum. This is apparently a derived character state. The remainder of the external morphology is rather nondescript. Thus, it is presently impossible to discuss any further the relationship of the species *Loxandrus pactinullus*, *Loxandrus negrei*, and *Loxandrus sculptilis*.

Ancestor 12 gave rise to two lineages. *Loxandrus tucumanus* appears to have changed little from its ancestor. In a second line arising from ancestor 12 that resulted in ancestor 13 the ring on the internal sac of the aedeagus completed its development into a form that is common today in many of our *Loxandrus* species. The ring was fully sclerotized and not enclosed by the internal sac (Fig. 95 A – R1).

Ancestor 13 gave rise to three lineages. *Loxandrus longiformis*, a species representing one lineage arising from ancestor 13, appears to have changed little from its hypothetical ancestor. The aedeagus of this species is unknown to me and its phylogenetic position may change when a male specimen is studied. In a second lineage arising from ancestor 13 the posterior angles of the pronotum became rounded (Figs. 51, 52). This character appears to have evolved several times in *Loxandrus*. This lineage resulted in ancestor 22. In the third lineage arising from ancestor 13 the microsculpture on the proepisternum became reduced or absent resulting in ancestor 14.

Ancestor 14 apparently gave rise to 3 distinct lineages and two species that have changed little from the ancestor. *Loxandrus gibbus* and *Loxandrus erraticus* are the two species that are similar to their ancestor. In another lineage arising from ancestor 14 the microsculpture on the proepisternum was entirely lost and resulted in ancestor 17. In a second distinct lineage arising from ancestor 14 the hind angles of the pronotum became rounded (Figs. 43 A, B; 44 A, B). This evolutionary pathway resulted in *Loxandrus rectus* and *Loxandrus pravitubus*. Both species have a characteristic scale pattern on the internal sac but I am unable to ascertain which of these two patterns represents the ancestral condition. In the third lineage arising from ancestor 14 the scale groups on the surface of the internal sac of the aedeagus became arranged in a characteristic pattern and gave rise to ancestor 15.

Hypothetical ancestor 15 is characterized by the development of two elongate groups of scales present on the ventral, basal portion of the internal sac of aedeagus (Fig. 102 D – SA2). This ancestor, ancestor 15, gave rise to two phylogenetic lineages. In one lineage the resulting species changed little from their ancestor. These species are *Loxandrus velocipes* and *Loxandrus inferus*. In the second lineage arising from ancestor 15 there developed a group of scales on the ventral surface in the center of the apical half of the sac (Fig. 101 C – SA1) which resulted in ancestor 16.

Ancestor 16 gave rise to one species that differs very little from it, *Loxandrus brevicollis*, and one distinct phylogenetic lineage. In the distinct phylogenetic lineage arising from ancestor 16 there developed a wide ring of small scales completely encircling the basal half of the

internal sac and a small group of elongate scales near the sclerotized ring of the internal sac (Figs. 102 A, B). These developments resulted in *Loxandrus nitidulus* and *Loxandrus circulus*.

Ancestor 17, which we have previously noted as arising in a lineage emanating from ancestor 14 through the loss of the microsculpture on the prosternum, gave rise to several phylogenetic lineages. Four species arose from ancestor 17 and appear to have changed very little from it. The four species are *Loxandrus amplicolis*, *Loxandrus crenatus*, *Loxandrus saphyrinus* and *Loxandrus lucens*. I have not seen a male of *Loxandrus amplicolis* and I place the species here only tentatively. It should also be noted that the sclerotized ring of *Loxandrus crenatus* is very different from the other *Loxandrus* species in this group (Fig. 104 – R1). In another line arising from ancestor 17 the intercoxal process of the prosternum became margined resulting in ancestor 21. In the last lineage arising from ancestor 17 there developed on each side of the ventro-lateral surface in the basal quarter of the internal sac a round or elongate group of scales that resulted in ancestor 18 (Figs. 108 C; 110 B; 109 C, D, E, F – SA1). We have previously noted a similar group of scales arising in a lineage arising from ancestor 14 and resulting in ancestor 15. In this lineage, however, the group was always elongate.

Ancestor 18 gave rise to two lineages. The first lineage resulted in *Loxandrus uniformis*, a species that apparently changed little from its ancestor. In the second lineage arising from ancestor 18 the basal, ventral scale group on the left side of the sac lost its elongate form by becoming larger and more oval in form (Fig. 108 C – SA1) resulting in ancestor 19.

Ancestor 19 also gave rise to two lineages. One lineage, represented in our present day fauna by *Loxandrus micans*, seems to have changed little from its ancestor. In the second lineage arising from ancestor 19 there developed an additional group of scales on the ventral surface in the center of the basal half of the internal sac (Figs. 109 E; 110 C – SA2). This lineage resulted in ancestor 20 which in turn gave rise to *Loxandrus duryi* and *Loxandrus vitiosus*. These species have characteristic scale patterns on the internal sac but I am unable to discern the ancestral state.

Ancestor 21, which arose from a phylogenetic line emanating from ancestor 17 previously discussed, gave rise to several phylogenetic lineages. Four of these lineages resulted in *Loxandrus rufilabris*, *Loxandrus atronitens*, *Loxandrus major*, and *Loxandrus medius*. In a fifth lineage arising from ancestor 21 the punctures on the pronotum were lost. This resulted in *Loxandrus australiensis*.

The internal sacs of the aedeagii of *Loxandrus major* (Fig. 111 B),

Loxandrus rufilabris (Fig. 112) and *Loxandrus medius* (Figs. 114 B, C), originating from ancestor 21 (a male is unknown for *Loxandrus amplicolis* and therefore questionable) are characteristically devoid of distinct organized scale groups. This apparently represents a lost character after the main evolutionary stream of *Loxandrus* had developed characteristic scale groups on the internal sacs.

Ancestor 22 arose from ancestor 12 through the development of rounded posterior angles of the pronotum as mentioned previously. It should be noted here that this is the second time this adaptation has occurred in *Loxandrus*. Previously it occurred in a lineage arising from ancestor 14 and resulting in *Loxandrus rectus* and *Loxandrus pravitubus*.

Ancestor 22 gave rise to at least two and possibly three lineages. *Loxandrus yeariani* is a species that has apparently changed little from the hypothetical ancestor 22 from which it arose. Its placement here in the phylogeny is tentative because it possesses some characters that would suggest other relationships. A second line arising from ancestor 22 resulted in ancestor 23. In this line there developed two small parallel groups of scales on the dorsal surface of the sac at the base (Figs. 116; 117; 118 A, B – SA1). The third line arising from ancestor 22 resulted in ancestor 24. In this lineage there developed a tendency for ambulatory setae to be present on the second abdominal sternite. This character is expressed in many specimens of the resulting species but not in all.

Ancestor 23 apparently gave rise to three species, *Loxandrus minor*, *Loxandrus cinnamtiensis* and *Loxandrus robustus*, that have changed little from the ancestor.

Ancestor 24 gave rise to two lineages. In one lineage punctures on the metepisternum, and mesepisternum were lost (Figs. 20 A, B). This resulted in ancestor 26. In the second lineage arising from ancestor 24 there developed a secondary sac on the left lateral surface of the primary sac of the males (Figs. 120 A, B; 121 A, C – SS). This resulted in ancestor 25 which in turn gave rise to two species represented in our present day fauna, *Loxandrus saccisecundaris* and *Loxandrus parallelus*. These two species have evidently changed little from hypothetical ancestor 25.

Ancestor 26, which arose from ancestor 22 through the loss of punctures on the mesepisternum and metepisternum, gave rise to several phylogenetic lines. In one line arising from ancestor 26 there developed on the left lateral surface of the internal sac a characteristic group of scales. In some species the group is elongate (Fig. 122 B – SA1) while in others it is more rounded (Fig. 127 A – SA 1). The group does, however, appear to have the same general position in all the

species evolving past this point in the phylogeny. This evolutionary pathway led to ancestor 29. In a second lineage arising from ancestor 26 the median lobe of the aedeagus became modified and resulted in ancestor 27. In addition to these two lineages there arose from ancestor 26 two species that have apparently changed little from their ancestor. These two species are *Loxandrus floridanus* and *Loxandrus unilobus*.

Ancestors 27 and 28 and the three species resulting from them, *Loxandrus velox*, *Loxandrus aduncus* and *Loxandrus agilis*, represent a phylogenetic sequence in which the median lobe of the aedeagus became highly modified. Based on the general appearance of the morphology I have arranged these three species in what appears to be the evolutionary sequence beginning with the simplest, *Loxandrus velox* (Figs. 134, A, B), an intermediate form, *Loxandrus aduncus* (Figs. 124 A, B), and the most complex, *Loxandrus agilis* (Fig. 125). The reader is cautioned that this is the only place in this phylogeny in which this kind of criterion is used. Note also that the ambulatory setae on the second abdominal sternite in *Loxandrus velox* have not been verified.

Ancestor 29 which arose from ancestor 26, as previously discussed, gave rise to two distinct phylogenetic lineages and two additional species. The two species *Loxandrus rossi* and *Loxandrus taeniatius* would appear to have changed little from their ancestor. In another lineage arising from ancestor 29 there developed on the internal sac a crescent-shaped group of scales on the lateral surface of the left side resulting in ancestor 32 (Figs. 132 A; 133 B – SA1). Ancestor 29 also give rise to yet another lineage in which developed one elongate group of scales in the apical $\frac{1}{2}$ of the internal sac near the sclerotized ring, more or less on the ventral surface (Figs. 129 C; 130 C; 131 A – SA1). This resulted in ancestor 30.

Ancestor 30 gave rise to two lineages. One lineage is represented by *Loxandrus minutus*, a species that appears to have changed little from its ancestor. In the second lineage arising from ancestor 30, additional groups of scales developed near the sclerotized ring on the internal sac of the aedeagus and this resulted in ancestor 31 (Figs. 130 A, B, D; 131 A, B – SA2).

Ancestor 31 gave rise to two species *Loxandrus cervicalis* and *Loxandrus extendus*. The former species, *Loxandrus cervicalis*, appears to have changed very little from its ancestor while in the latter species, *Loxandrus extendus*, the lateral margins of the metasternum have become punctate (Fig. 19 C).

Ancestor 32 which arose from ancestor 29 as previously discussed gave rise to two phylogenetic lineages. One lineage resulted in

Loxandrus algidus, a species that seems to have changed little from its ancestor. In the second lineage arising from ancestor 32 there was an addition of a large group of scales that is partially enclosed by the crescent-shaped scale group (Fig. 132 A – SA2). This evolutionary line resulted in *Loxandrus spinilunatus*.

Based on the information I now possess, I believe that the above discussion is the one most plausible concerning the evolutionary history of the species comprising the genus *Loxandrus*.

ZOOGEOGRAPHY

At the present time there appear to be two general schools of thought concerning methods to be employed in the study of the zoogeography of animals. One group of zoogeographers tends to utilize the "working principles" set forth by Darlington (1957). A second group of zoogeographers places more emphasis on first studying the phylogenetic relationships of taxa. Once these phylogenetic relationships are postulated the present day geographical ranges and data from historical geography are utilized to form hypotheses concerning the past dispersals of the organisms. W. H. Henig and H. H. Ross are two leading proponents of the second method. In the following discussion essentially the latter approach has been followed.

Two factors greatly hinder a discussion of the historical zoogeography of *Loxandrus*. These are (1) an inadequate knowledge of the distribution of most species, and (2) the sympatric distribution of many species, especially species pairs.

Loxandrus in North America.

Current data concerning phylogenetic relationships and distribution patterns, indicate that there are two basic faunal groups of *Loxandrus* in North America. One fauna is found primarily in the Southeastern United States while the second fauna is found primarily in the Middle American-West Indies region of North America. A few species are common to both areas. A study of phylogeny and distribution patterns as presented in Fig. 183 indicates the following sequence of events in the past dispersal of the genus *Loxandrus*.

Those species that are more closely related to the hypothetical ancestor of the genus *Loxandrus* (ancestor 1) are now found in Middle America and in South America—*L. infimus*, *L. dubius*, *L. elongatus*, *L. sculptilis*, *L. negrei*, *L. pacticulus* and *L. tucumanus*. The fauna now endemic to the Southeastern United States apparently arose from hypothetical ancestor 12 and resulted in ancestor 13. Ancestor 13 gave rise to three lineages that resulted in ancestor 14, ancestor 22, and one existent species (*L. longiformis* known only from Australia).

The factors that led to the geographical isolation of populations and subsequent evolution of the species that now comprise the genus *Loxandrus* in North America are not at all evident. Freitag and Ball (in Freitag 1969) have suggested that "The analysis of the distribution of pairs of closely related species (sister species) seems to be the most fruitful approach to historical zoogeography at the local level. Their distributions are likely to provide the clearest evidence of location of former barriers and patterns of phylogeny. Of course this is true only if the two sister species are largely allopatric."

Examination of the phylogeny presented in Fig. 183 and the distribution maps, Figs. 144–176, indicates that there are two species pairs in the Southeastern United States and three species pairs in Middle America that are allopatric. They are listed as follows: Southeastern United States—*saccisecundaris-parallelus*; *spinilunatus-algidus*. Central America—*fraus-unispinus*; *nocticolor-rectangulus*; *dubius-elongatus*.

The two species pairs found in the Southeastern United States indicate a barrier or barriers that divided a once single large population into an east and west population that have now evolved into distinct species. In both cases, *saccisecundaris-parallelus*, *spinilunatus-algidus*, the barrier may well have been the Mississippi Embayment on the Mississippi River Basin as it served as an outlet for glacial flood waters. In the case of the *spinilunatus-algidus* pair the barrier could have been the Allegheny Mountain Range although I doubt this since *L. spinilunatus* has not been found east of the Mississippi River.

Evidence for barriers that divide populations into north and south segments is almost absent among *Loxandrus* species. None of the species pair groups indicate this type of division. Only in the case of *L. duryi* is there an indication of distinct north and south populations (Fig. 166). In this species the northern population is found in Indiana, Ohio, and Pennsylvania, while the southern population is found in Western Louisiana and Eastern Texas.

Ross (1967) pointed out "that the inter-American and circum-Caribbean area has been one of the world's most prolific hotbeds of evolution and speciation." This author goes on to say "It is now becoming more and more probable that Central America and the West Indies have been connected at times, and broken up into several isolated land masses at other times, at least since mid-Cretaceous, and possibly with the fracturing reaching its maximum degree during mid-Tertiary." It is also known that the inter-American land masses have been alternately connected and broken with the South American continent during the geological history of this area. This type of history could easily account for the division and isolation of a single

population into two segments that would have led to the evolution of the three species pairs found in Middle America and South America—*fraus-unispinus*, *nocticolor-rectangulus*, *dubius-elongatus*.

The discussion of the past dispersal patterns of the genus *Loxandrus* and the analysis of the sister species pairs are only as strong as the phylogeny. The zoogeographic patterns and the phylogenetic relationships as presented above seem to be compatible in most respects but there are two areas that cause concern at the present time. Both problems have to do with the Australian fauna. Firstly, the evidence presented in this paper indicates that the present day Australian fauna has been derived from three separate phylogenetic lineages. This is in direct conflict with the rule of parsimony. It would be much simpler if it were possible to account for the Australian *Loxandrus* fauna being derived from a single phylogenetic line. Secondly, those species that are more closely related to the hypothetical ancestor of the genus *Loxandrus* are found in Middle America and in South America. This would indicate that the genus *Loxandrus* may have its origin in the New World. This is directly opposite from the views of Darlington (1962) who felt that the genus had originated in Australia and spread to the New World early in geological history. Elucidation of both the South American and Australian faunas should help to solve these problems.

Loxandrus and the insect fauna of the Eastern United States.

Van Dyke (1939) postulated that the coleopterous fauna of the Eastern United States had been derived from faunal regions outside this area. In other words he indicated that our present day beetle species migrated into the Eastern United States. Ross (1953) has already pointed out the fallacy of this argument. Numerous other workers have also contributed data showing that not only migration but also the evolution of "new" species from resident populations in the Eastern United States have been a common occurrence for millions of years. In fact much of the entomological literature concerning insect zoogeography in North America has dealt with speciation and the physical factors contributing to speciation, especially the effect of Pleistocene glaciation on our Eastern United States fauna. It is to this phenomenon of Pleistocene glaciation and its effect on the insect fauna of the Eastern United States that I would now like to direct a few comments.

There seems to be no question that Pleistocene events had a profound effect on the evolution of the insect fauna of the Eastern United States. The question is rather "how did the insect fauna react to these Pleistocene events?"

Two opposing theories have been postulated concerning the effect of Pleistocene glaciation and climates on the biota of the Eastern United States. Proponents of the first theory believe that the climate of the Pleistocene had a profound effect, shifting large segments of the fauna and flora of the Eastern United States several hundred miles southward. Opposing this theory is the idea that the biota in front of the glaciers was little disturbed for any great distance. Howden (1969) has summarized much of the entomological literature dealing with the Pleistocene climate and fauna in the Eastern United States. From Howden's review article, from other literature (mostly consulting directly the papers he cites) and from my work with two warm-adapted beetle groups (*Loxandrus* and the carabid tribe Morionini) there seems to be a measure of truth in each of the two above-mentioned theories. The crucial factor in whether or not North American Pleistocene climates had a displacement effect on a particular group of insects revolves around the question of whether the group is primarily adapted to cooler climates and therefore has a more northern range or whether it is adapted to warmer climates and has a more southern range.

The following brief statements summarize the ways in which an insect population may have reacted to the momentous events of the Pleistocene Age. (1) Certain populations were displaced to a more southern range as the glacier itself advanced. As the ice retreated, relict southern populations were left behind as other portions of the population moved northward. These two populations subsequently became separated by ecologically inclement barriers and evolved independently of one another. Ross (1965) has given several examples of this occurring among the caddisflies. (2) Some groups with a more southern range were not displaced but their populations were fragmented by related Pleistocene events. The evolution of these groups was essentially "an *in situ* development" (Howden 1969). (3) Populations could have been entirely destroyed. (4) Populations could have been displaced southward and then retreated northward without leaving relict populations. Fossil evidence would be the only means of detecting type 3 and 4 reactions. (5) Populations could have been displaced southward then retreated northward leaving a relict population, the two populations then becoming geographically isolated but neither evolving into a different species (*Allocapnia pygmaea*, Ross 1965). (6) The population was seemingly unaffected by Pleistocene events (*Moirion monilicornis*, Allen 1968).

Figs. 177 and 178 illustrate the known locality records for all species in the genus *Loxandrus*. Figs. 144 to 176 illustrate the distribution of the individual species of *Loxandrus*. When the distribution patterns of the individual species are examined it is found that of the 34

TABLE IV.

General distribution of *Loxandrus* species occurring in the Eastern United States

Species Endemic to the Coastal Flood Plain	Species Endemic to an Area North of the Coastal Flood Plain	Species Occurring in the Coastal Flood Plain & in Northern Areas
<i>L. parallelus</i>	<i>L. rossi</i>	<i>L. circulus</i>
<i>L. agilis</i>		<i>L. lucens</i>
<i>L. aduncus</i>		<i>L. pravitubus</i>
<i>L. taeniatus</i>		<i>L. rectus</i>
<i>L. crenatus</i>		<i>L. nitidulus</i>
<i>L. cervicalis</i>		<i>L. duryi</i>
<i>L. floridanus</i> ¹		<i>L. erraticus</i>
<i>L. minutus</i>		<i>L. velocipes</i>
<i>L. micans</i>		<i>L. saphyrinus</i>
<i>L. unilobus</i>		<i>L. cincinnatiensis</i>
<i>L. algidus</i>		<i>L. minor</i>
<i>L. rectangulus</i> ¹		<i>L. vitiosus</i>
		<i>L. gibbus</i>
		<i>L. robustus</i>
		<i>L. brevicollis</i>
		<i>L. celeris</i> ¹
		<i>L. uniformis</i>
		<i>L. extendus</i>
		<i>L. velox</i> ²
		<i>L. spinilunatus</i> ²
		<i>L. saccisecundaris</i> ²

¹ Species occurring in the West Indies and/or Mexico.

² Species whose range is not definitely known.

species of *Loxandrus* found in the Eastern United States 10 are endemic to the coastal flood plains. Two species are found in the coastal flood plains but also have ranges extending into the West Indies or Mexico. One species is endemic to an area outside the coastal flood plain, 18 species occur both in and outside the coastal flood plain and the exact range of 3 species is unknown. These data as presented here and in Table IV seem to indicate that *Loxandrus* is a taxon in which many of the species are more or less adapted to warmer climates. Effects of Pleistocene events on this genus are elusive. There is no doubt that the paucity of known locality records contributes to this problem. A second factor may be due to *Loxandrus* being a relatively old taxon, the members of which have not experienced a great amount

of speciation for some time. More information concerning this question as well as the many others that have been raised will hopefully be forthcoming as work continues on the insect fauna in North America.

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